IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

MURRAY WALTER PISONY, *Plaintiff,*	§	Civ. A. No. 6:17-cv-00055-RP-JCM
v.	§	
COMMANDO CONSTRUCTION, INC. and JAMES MCLEOD HOLDINGS INC. *Defendants.*	§	JURY DEMANDED

JOINT CLAIM CONSTRUCTION AND PREHEARING STATEMENT

Pursuant to the Court's Scheduling Order, Plaintiff Murray Walter Pisony ("Plaintiff") and Defendant Commando Construction, Inc. ("Defendant" or "CCI") (collectively the "parties") hereby submit their Joint Claim Construction and Prehearing Statement regarding United States Patent No. 7,591,629 (the "'629 Patent" or "patent-in-suit"). Though James McLeod Holdings Inc. has been brought in as a defendant in the instant suit, it has not yet answered. The parties do not believe the addition of this entity will affect claim construction in any way.

A. Each Party's Proposed Construction of Each Disputed Claim Term

Following the conference of counsel in an attempt to narrow the claim construction issues before the Court, the remaining terms in dispute are as follows:

Claim term, phrase or clause	Claim number	Plaintiff's Proposed Construction	Defendant's Proposed Construction
"extendible mast"	Claim 1	"A structural support member capable of raising and lowering"	"a vertical pole or similar structure that can increase in length"
"the conveyor assembly includes … *a pivotal*	Claim 1	Plain and ordinary meaning. In the alternative only, Plaintiff contends that this	"the conveyor assembly frame includes a pivot that allows the angle between the conveyor assembly

connection for the frame to permit angular adjustment of the frame relative to the chassis"		phrase should be accorded the meaning that would have been understood by one of ordinary skill in the art at the time of the invention, which is: "a connection that permits angular movement of the frame relative to the chassis"	frame and the chassis to change"
"mast includes a hydraulic cylinder drivable to telescope to various lengths"	Claim 6	Plain and ordinary meaning. In the alternative only, Plaintiff contends that this phrase should be accorded the meaning that would have been understood by one of ordinary skill in the art at the time of the invention, which is: "mast incorporates a hydraulic cylinder drivable to telescope to various lengths."	"a hydraulic cylinder within the extendable mast causes the extendable mast to vary in length in a telescoping manner (i.e., overlapping sections slide in and out from one another)"

The parties have attached charts hereto as Exhibit A and Exhibit B that show each party's proposed construction of each disputed claim term, phrase, or clause, together with the intrinsic and extrinsic evidence on which each party intends to rely to support its proposed constructions.

Where intrinsic and extrinsic citations have been made for a particular claim term, phrase, or clause they should be understood as applicable to each other instance where the same term, phrase, or clause appears elsewhere. Each party reserves the right to rely on any intrinsic or extrinsic evidence identified by the other party.

B. Anticipated Length of Time Necessary for Claim Construction Hearing

The parties anticipate that they will need approximately 2 hours, split equally between Plaintiff and CCI, for presentation relating to the disputed claim terms. The parties believe that the presentation of the disputed claim terms should be on a term-by term basis.

C. Witness Testimony at Claim Construction Hearing

Plaintiff reserves the right to call its expert, Dr. Jahan Rasty in support of Plaintiff's proposed claim constructions and to respond to any claim construction positions or arguments offered by CCI. Plaintiff also may submit a declaration of Dr. Rasty at the time it files its opening and/or responsive claim construction briefing. Plaintiff anticipates that the substance of Dr. Rasty's testimony and/or declaration may include the following: 1) that the terms, clauses and/or phrases in '629 Patent that the parties have proposed for construction based on the intrinsic and extrinsic evidence provided by the parties should either be construed as Plaintiff has proposed or that no construction is necessary where Plaintiff has proposed plain and ordinary meaning; 2) the level of ordinary skill in the art relating to the invention of the '629 Patent; 3) the common knowledge of one of ordinary skill in the art at the time the '629 Patent was filed; and 4) a summary of the subject matter of the patent-in-suit. Dr. Rasty may also provide expert testimony and/or declaration to rebut any arguments made by CCI and/or its expert(s) regarding claim construction. A copy of Dr. Rasty's curriculum vitae is attached hereto as Exhibit C.

CCI may call its expert, Dr. Richard H. Crawford, to testify at the claim construction hearing regarding CCI's proposed claim constructions and to respond to Plaintiff's proposed claim constructions and arguments in support thereof. CCI anticipates submitting a declaration from Mr. Crawford in support of CCI's opening and responsive claim construction briefs. Mr. Crawford will testify and/or provide a declaration regarding the meanings of the claim terms identified above. He will also provide testimony regarding the level of ordinary skill in the art relating to the subject matter of the '629 patent. He is also expected to testify regarding the disclosure of the '629 patent, the meaning of each claim term as it would be understood by a person of ordinary skill in the art, based on the disclosures of the '629 patent and other related patents, the way the term is used in the context of the claim language as a whole, and the prosecution histories for the '629 patent and

related patents. Dr. Crawford may also provide testimony regarding Plaintiff's proposed constructions, why Plaintiff's proposed constructions are unsupported by and contradict the specification and prosecution history, and how Plaintiff's proposed constructions, if adopted, would ensnare the prior art and render the '629 patent invalid. Dr. Crawford's curriculum vitae is attached hereto as Exhibit D.

D. Other Issues for a Prehearing Conference Prior to the Claim Construction Hearing

The parties request a prehearing conference to discuss the scheduling of the Claim Construction Hearing. The parties have conferred and both are available at the Court's convenience from September 11 to September 28 for a Claim Construction Hearing. At this time, the parties are unaware of any other issues that would be appropriate for a prehearing conference.

DATED: June 11, 2018

Respectfully submitted,

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Attorneys for Defendant Commando Construction, Inc.

CERTIFICATE OF SERVICE

On June 11, 2018, I electronically filed the foregoing with the Clerk of Court using the CM/ECF system. I hereby certify that I have served all counsel and/or *pro se* parties of record electronically or by another manner authorized by the Federal Rules of Civil Procedure.

/s/ John T. Wilson
John T. Wilson

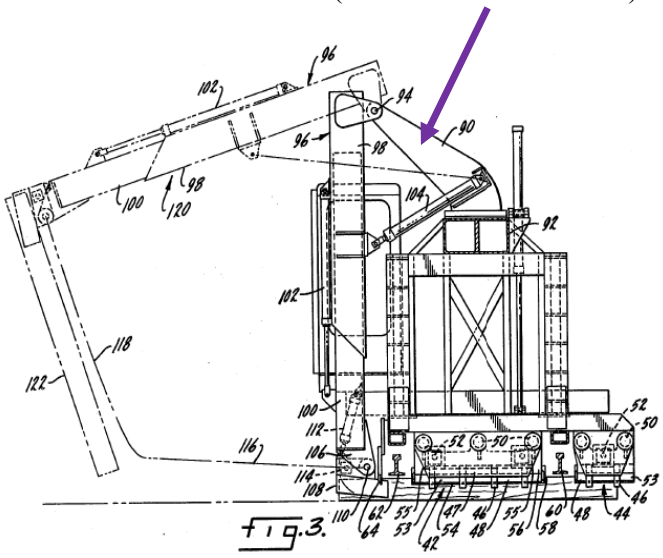
Exhibit A

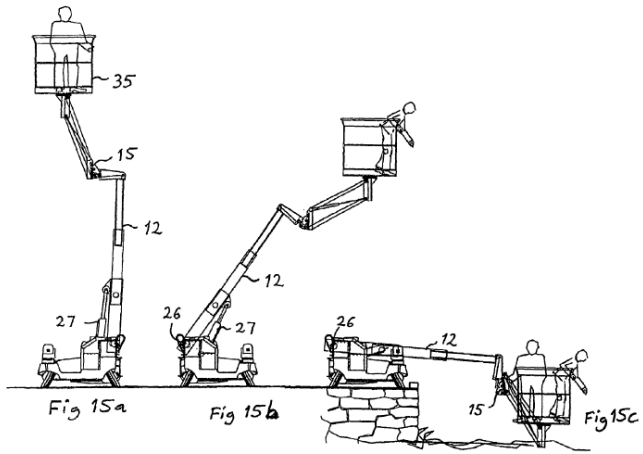
EXHIBIT A

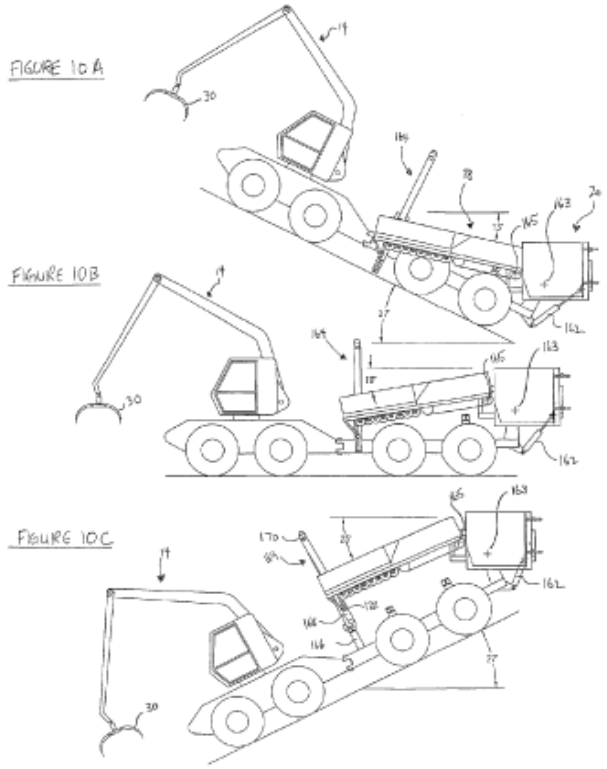
Plaintiff's Proposed Constructions regarding United States Patent No. 7,591,629 (the "'629 Patent")

Claim term, phrase or clause	Claim number	Plaintiff's Proposed Constructions	Intrinsic and Extrinsic Support
"extendible mast"	Claim 1	"A structural support member capable of raising and lowering"	Intrinsic Evidence: The entire '629 Patent, prosecution history and patents cited and incorporated by reference therein, *see e.g.*: "In yet another embodiment, the apparatus further comprises a means of raising and lowering the conveyor assembly." (Col. 2, ll. 39-41) "The apparatus may further comprise a mast assembly for raising and lowering the conveyor assembly." (Col. 3, ll. 18-20) The "apparatus may also comprise a mast assembly 164 to raise and lower the conveyor assembly 18, to accommodate for the slope of the land on which the apparatus is being used. (Col. 10, ll. 43-45) Claim 7 depends from and further narrows Claim 1, demonstrating that the patentee intended the term "extendible mast" in claim 1 to be broader than the description of a mast in Claim 7. The claims containing the term "extendible mast" and "mast" (Claim 26, 27, 30-32 in prosecution that later became Claim 1, 2, 5-7 in the issued '629 Patent) were allowed by the examiner based, in part, on the "accompanying description in the specification at paras.

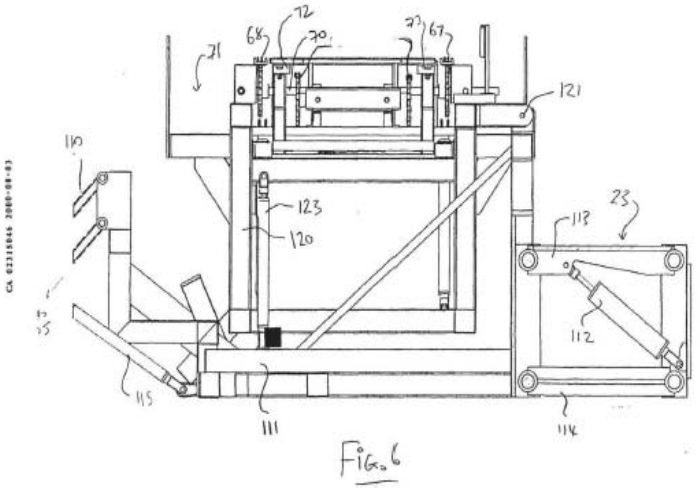
			[84-86] (claims 26-32). . . " *See* Certified Prosecution History of '629 Patent at Office Action Summary, dated January 15, 2009, at pages 6-7 – PISONY003435-003436. Paragraphs 84-86 of the specification appear in the Certified Prosecution History at PISONY003260-003261. Paragraph 85 of the specification to which the examiner refers in allowing the claim states: "The apparatus may also comprise a mast assembly 164, ***to raise and lower*** the conveyor assembly 18, to accommodate for the slope of the land on which the apparatus is being used." Specification at ¶85 - PISONY003261 (emphasis added). The arguments of Applicant's prosecution counsel on December 9, 2008 in the prosecution history further indicate that none of the prior art references cited by the examiner (as to other claims) "teach or even suggest the function, or any component for achieving, angular adjustment of the frame of the conveyor assembly upstream of the stacking assembly to adjust the approach angle of the conveyor relative to the unscrambling hopper." *See* Certified Prosecution History – PISONY003425-003426. The mast is one such component in the '629 Patent and this is one of the bases on which the examiner allowed the current claims of the '629 Patent. *See* PISONY003435-003436. The arguments of Applicant's prosecution counsel on December 9, 2008 in the prosecution history indicate that none of the prior art references cited by the examiner (as to other claims) "teach a conveyor assembly upstream of a stacking assembly that includes ***a driver that can be driven*** to pivot the frame of the conveyor assembly relative to the chassis of the apparatus." *See* Certified

			Prosecution History – PISONY003425-003426. This is one of the bases on which the examiner allowed the current claims of the '629 Patent. *See* PISONY003435-003436 (emphasis added). United States Patent No. 4,127,070 ("'070 Patent") cited in the prosecution history and considered by the examiner included "a mast . . . shown generally at 90 on a superstructure 92 on top of the frame and is bent or disposed to one side with a pivot 94 . . ." ('070 Patent: Col. 4, ll. 18-20); *see* Certified Prosecution History – PISONY003230-003468 at PISONY003385. *See* FIG. 3 of the '070 Patent (arrow to mast 90 added):  Fig. 3.

			Extrinsic Evidence: Plaintiff intends to rely on the Declaration of Dr. Jahan Rasty in support of Plaintiff's claim construction and possibly testimony from Dr. Rasty at the *Markman* hearing. "Extend": to spread or stretch forth . . . to cause to reach . . . to cause to be of greater area . . . to stretch out in distance, space. *Merriam-Webster.com. Merriam-Webster, n.d. Web. 2* May 2018. United States Patent No. 7,384,233 shows a "lifting unit is carried by the chassis via a mast-like beam (12), that is pivotably connected to the chassis about a substantially horizontal axis. Power means is arranged to pivot the beam about this axis relative to the chassis." *See e.g.*, Abstract and FIGS. 15A-C below. 

Claim term, phrase or clause	Claim number	Plaintiff's Proposed Constructions	Intrinsic and Extrinsic Support
"the conveyor assembly includes … *a pivotal connection for the frame to permit angular adjustment of the frame relative to the chassis*"	Claim 1	Plain and ordinary meaning. Plaintiff contends that this phrase does not require construction in part because the functional relationship of the components involved in the pivotal connection are clearly described later in the claims, i.e. "an extendible mast connected between the frame and the chassis to drive the frame about the pivotal connection." In the alternative only, Plaintiff contends that this phrase should be accorded the meaning that would have been understood by one of ordinary skill in the art at the time of the invention, which is: "a connection that permits angular movement of the frame relative to the chassis"	Intrinsic Evidence: The entire '629 Patent, prosecution history and patents cited and incorporated by reference therein, *see e.g.*: "[T]he end of conveyor assembly 18 may also pivot about pivot point 165." (Col. 10, ll. 41-42) 

			The arguments of Applicant's prosecution counsel on December 9, 2008 in the prosecution history indicate that none of the prior art references cited by the examiner (as to other claims) "teach a conveyor assembly upstream of a stacking assembly that includes a driver that can be driven to pivot the frame of the conveyor assembly relative to the chassis of the apparatus." *See* Certified Prosecution History – PISONY003230-003468 at PISONY003425-003426. This is one of the bases on which the examiner allowed the current claims of the '629 Patent. *See* PISONY003435-003436. The arguments of Applicant's prosecution counsel on December 9, 2008 in the prosecution history further indicate that none of the prior art references cited by the examiner (as to other claims) "teach or even suggest the function, or any component for achieving, ***angular adjustment of the frame*** of the conveyor assembly upstream of the stacking assembly to adjust the approach angle of the conveyor relative to the unscrambling hopper." *See* Certified Prosecution History – *see* Certified Prosecution History – PISONY003230-003468 at PISONY003425-003426. This is one of the bases on which the examiner allowed the current claims of the '629 Patent. *See* PISONY003435-003436 (emphasis added). <u>Extrinsic Evidence</u>: Plaintiff intends to rely on the Declaration of Dr. Jahan Rasty in support of Plaintiff's claim construction and possibly testimony from Dr. Rasty at the *Markman* hearing. "Pivot": a shaft or pin on which something turns. *Merriam-Webster.com. Merriam-Webster, n.d. Web.* 8 May 2018.

Claim term, phrase or clause	Claim number	Plaintiff's Proposed Constructions	Intrinsic and Extrinsic Support
"mast includes a hydraulic cylinder drivable to telescope to various lengths"	Claim 6	Plain and ordinary meaning. Plaintiff contends that this phrase does not require construction. In the alternative only, Plaintiff contends that this phrase should be accorded the meaning that would have been understood by one of ordinary skill in the art at the time of the invention, which is: "mast incorporates a hydraulic cylinder drivable to telescope to various lengths." *See* Plaintiff's proposed construction of "*extendible mast*" identified above and incorporated fully here by reference.	*See* Plaintiff's intrinsic and extrinsic evidence for "*extendible mast*" identified above and incorporated fully here by reference. Intrinsic Evidence: The entire '629 Patent, prosecution history and patents cited and incorporated by reference therein. Canadian Patent Document No. 02315046 ("Canadian '046") cited in the prosecution history and considered by the examiner demonstrates common usage of the term ***includes***: "The hitch 23 includes a cylinder 112. . ." (Canadian '046, *e.g.* Page 24, ll. 17-18 and FIG. 6 shown below); *see* Certified Prosecution History – PISONY003230-003468 at PISONY003328-003373.  Fig. 6

			Extrinsic Evidence: Plaintiff intends to rely on the Declaration of Dr. Jahan Rasty in support of Plaintiff's claim construction and possibly testimony from Dr. Rasty at the *Markman* hearing. "Include": to comprise as part of a whole . . . to contain between or within. *Merriam-Webster.com. Merriam-Webster, n.d. Web. 4* May 2018.

Exhibit B

EXHIBIT B

DEFENDANT/COUNTERCLAIM PLAINTIFF COMMANDO CONSTRUCTION, INC.'S PROPOSED CLAIM CONSTRUCTIONS AND IDENTIFICATION OF INTRINSIC AND EXTRINSIC EVIDENCE

U.S. Patent No. 7,591,629 ("the '629 patent")

Claim Language	CCI's Proposed Construction and Evidence
Claim 1 "the conveyor assembly includes … *an extendable mast*"	**PROPOSED CONSTRUCTION:** "a vertical pole or similar structure that can increase in length" **INTRINSIC EVIDENCE:** The '629 patent: The claim language itself; Figs. 2, 10A-C, 11A-B; and col. 2, ll. 39-41; col. 3, ll. 18-20; col. 10, ll. 20-67. The entire '629 Prosecution History, including, for example: • Application No. 11/160,060 filed June 7, 2005 (Pisony003239-3277), at Pisony003264-3265 (claims 1 and 7) and Pisony003266-3267 (claims 12 and 15); • Non-Final Office Action dated September 28, 2007 (Pisony003379-3383), at Pisony003381; • Amendment and Remarks dated March 25, 2008 (Pisony003388-3394), at Pisony003389-90 (claims 1 and 7) and Pisony003391 (claims 12 and 15); • Final Office Action dated June 9, 2008 (Pisony003399-3407), at Pisony003401-3402; • Amendment and Remarks dated December 9, 2008 (Pisony003418-

Claim Language	CCI's Proposed Construction and Evidence
	3427), at Pisony003419-3420 (claims 1 and 7); Pisony003421-22 (claims 26 and 31); and Pisony003425-3426; • Final Office Action dated January 15, 2009 (Pisony003429-3437), at Pisony003431-3432 and Pisony003435-3436. **EXTRINSIC EVIDENCE:** • Merriam-Webster Dictionary (mast) (CCI0008895-8897) • The American Heritage Dictionary (mast) (CCI0009081-9083) • Webster's New World College Dictionary (mast) (CCI0009025-9027) • Webster's New College Dictionary (mast) (CCI0008982-8984) • Webster's Unabridged Dictionary (mast) (CCI0009066-9068) • Illustrated Oxford Dictionary (mast) (CCI0008819-8821) • Dictionary of Construction, Surveying and Civil Engineering (mast) (CCI0008909-8912) • Oxford Dictionary of English (mast) (CCI0008918) • McGraw-Hill Dictionary of Scientific and Technical Terms (mast) (CCI0008919-8921) • The MacMillan Visual Dictionary (mast) (CCI0008834-8854) • Dictionary of Mechanical Engineering (CCI0008861-8868) • Merriam-Webster Dictionary (extend/extendable) (CCI0008886-8888) • The American Heritage Dictionary (extend/extendable) <u>Evidence in Opposition to Plaintiff's Proposed Claim Constructions</u> • U.S. Patent Application No. 12/539,740 and its prosecution history (CCI0000708-812), including, for example:

Claim Language	CCI's Proposed Construction and Evidence
	○ U.S. Patent Application No. 12/539,740, filed on August 12, 2009 (CCI0000711-0000744), at CCI0000733-0000734 (claims 12 and 15); ○ Preliminary Amendment dated November 19, 2009 (CCI CCI0000780-0000787), at CCI CCI0000783-0000784 (claims 12 and 15) and CCI0000786; ○ Office Action dated June 14, 2010 (CCI0000794-0000802), at CCI0000799 and CC0000800-801 • U.S. Patent No. 3,620,273 (CCI00003578-3582), at Figs. 1-2; Col. 1, ll. 37-47; Col. 2, ll. 9-21; Col. 2, ll. 31-39; Col. 3, ll. 41-43 • U.S. Patent No. 2,971,591 (CCI0001067-1074), at Figs. 2, 4 and 5; Col. 2, ll. 31-41 • U.S. Patent No. 5,944,479 (CCI0001402-1423), at Figs. 2-5; Col. 4, ll. 8-18; Col. 4, ll. 52-58 • U.S. Patent No. 3,802022 (CCI0001743-1756), at Figs. 1, 2 and 4; Col. 3, ll. 29-39; Col. 4, ll. 39-43 • The declaration of Dr. Richard H. Crawford
Claim 6 "the mast includes a hydraulic cylinder drivable to telescope to	**PROPOSED CONSTRUCTION:** "a hydraulic cylinder within the extendable mast causes the extendable mast to vary in length in a telescoping manner (i.e., overlapping sections slide in and out from one another)"

Claim Language	CCI's Proposed Construction and Evidence
various lengths"	**INTRINSIC EVIDENCE:** The '629 patent: The claim language itself; Figs. 2, 10A-C, 11A; and col. 2, ll. 39-41; col. 3, ll. 18-20; col. 10, ll. 20-67. The entire '629 Prosecution History, including, for example: • Application No. 11/160,060 filed June 7, 2005 (Pisony003239-3277), at Pisony003264-3265 (claims 1 and 7) and Pisony003266-3267 (claims 12 and 15); • Non-Final Office Action dated September 28, 2007 (Pisony003379-3383), at Pisony003381; • Amendment and Remarks dated March 25, 2008 (Pisony003388-3394), at Pisony003389-90 (claims 1 and 7) and Pisony003391 (claims 12 and 15); • Final Office Action dated June 9, 2008 (Pisony003399-3407), at Pisony003401-3402; • Amendment and Remarks dated December 9, 2008 (Pisony003418-3427), at Pisony003419-3420 (claims 1 and 7); Pisony003421-22 (claims 26 and 31); and Pisony003425-3426; • Final Office Action dated January 15, 2009 (Pisony003429-3437), at Pisony003431-3432 and Pisony003435-3436. **EXTRINSIC EVIDENCE:** • Merriam-Webster Dictionary (mast) (CCI0008895-8897) • The American Heritage Dictionary (mast) (CCI0009081-9083) • Webster's New World College Dictionary (mast) (CCI0009025-9027) • Webster's New College Dictionary (mast) (CCI0008982-8984)

Claim Language	CCI's Proposed Construction and Evidence
	• Webster's Unabridged Dictionary (mast) (CCI0009066-9068) • Illustrated Oxford Dictionary (mast) (CCI0008819-8821) • Dictionary of Construction, Surveying and Civil Engineering (mast) (CCI0008909-8912) • Oxford Dictionary of English (mast) (CCI0008918) • McGraw-Hill Dictionary of Scientific and Technical Terms (mast) (CCI0008919-8921) • The MacMillan Visual Dictionary (mast) (CCI0008834-8854) • Dictionary of Mechanical Engineering (CCI0008861-8868) • Merriam-Webster Dictionary (extend/extendable) (CCI0008886-8888) • The American Heritage Dictionary (extend/extendable) • Merriam-Webster Dictionary (drivable) (CCI0008883-8885) • The American Heritage Dictionary (drivable) (CCI0008934-8936) • Webster's New World College Dictionary (drivable) (CCI0009009-9011) • Webster's New College Dictionary (drivable) (CCI0008967-8970) • Webster's Unabridged Dictionary (drivable) (CCI0009059-9062) • Illustrated Oxford Dictionary (drivable) (CCI0008806-8808) • Merriam-Webster Dictionary (telescope) (CCI0009093-9095) • The American Heritage Dictionary (telescope) (CCI0009090-9092) • Webster's New World College Dictionary (telescope) (CCI0009099-9101) • Webster's New College Dictionary (telescope) (CCI0009096-9098) • Webster's Unabridged Dictionary (telescope) (CCI0009087-9089) • Illustrated Oxford Dictionary (telescope) (CCI0009084-9086)

Claim Language	CCI's Proposed Construction and Evidence

	Evidence in Opposition to Plaintiff's Proposed Claim Constructions
	• U.S. Patent Application No. 12/539,740 and its prosecution history (CCI0000708-812), including, for example:
	  ○ U.S. Patent Application No. 12/539,740, filed on August 12, 2009 (CCI0000711-0000744), at CCI0000733-0000734 (claims 12 and 15);
	  ○ Preliminary Amendment dated November 19, 2009 (CCI CCI0000780-0000787), at CCI CCI0000783-0000784 (claims 12 and 15) and CCI0000786;
	  ○ Office Action dated June 14, 2010 (CCI0000794-0000802), at CCI0000799 and CC0000800-801
	• U.S. Patent No. 3,620,273 (CCI00003578-3582), at Figs. 1-2; Col. 1, ll. 37-47; Col. 2, ll. 9-21; Col. 2, ll. 31-39; Col. 3, ll. 41-43
	• U.S. Patent No. 2,971,591 (CCI0001067-1074), at Figs. 2, 4 and 5; Col. 2, ll. 31-41
	• U.S. Patent No. 5,944,479 (CCI0001402-1423), at Figs. 2-5; Col. 4, ll. 8-18; Col. 4, ll. 52-58
	• U.S. Patent No. 3,802022 (CCI0001743-1756), at Figs. 1, 2 and 4; Col. 3, ll. 29-39; Col. 4, ll. 39-43
	• The declaration of Dr. Richard H. Crawford

Claim Language	CCI's Proposed Construction and Evidence
Claim 1 "the conveyor assembly includes … *a pivotal connection for the frame to permit angular adjustment of the frame relative to the chassis"*	**PROPOSED CONSTRUCTION**: "the conveyor assembly frame includes a pivot that allows the angle between the conveyor assembly frame and the chassis to change" **INTRINSIC EVIDENCE:** The '629 patent: the claim language itself; Figs. 2, 10A-C and 11B; and col. 10, ll. 31- 42. The entire '629 Prosecution History, including, for example: Application No. 11/160,060 filed June 7, 2005 (Pisony003239-3277); Non-Final Office Action dated September 28, 2007 (Pisony003379-3383); Amendment and Remarks dated March 25, 2008 (Pisony003388-3394); Final Office Action dated June 9, 2008 (Pisony003399-3407); Amendment and Remarks dated December 9, 2008 (Pisony003418-3427); Final Office Action dated January 15, 2009 (Pisony003429-3437). **EXTRINSIC EVIDENCE:** • Merriam-Webster Dictionary (connection) (CCI0008877-8882) • The American Heritage Dictionary (connection) (CCI0008928-8933) • Webster's New World College Dictionary (connection) (CCI0009003-9005) • Webster's New College Dictionary (connection) (CCI0008964-8966) • Webster's Unabridged Dictionary (connection) (CCI0009049-9052) • Illustrated Oxford Dictionary (connection) (CCI0008800-8802)

Claim Language	CCI's Proposed Construction and Evidence
	• The declaration of Dr. Richard H. Crawford

Exhibit C

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Professor Jahan Rasty, Ph.D., PE, MBA, CFEI, CFII

Tenured Full-Professor of Mechanical Engineering – TTU
Director of the *Materials Performance & Failure Analysis Laboratory* – TTU
Registered Professional Engineer, State of Texas, Certificate No. 71689.

SPECIALIZATION:

- Forensic Engineering Accident Investigation – TTU Program Director,
- Design & Manufacturing of Machines, Equipment and Mechanisms,
- Failure Analysis of Metals, Polymers and Composites, Metallurgy,
- Corrosion and Environmentally-Assisted Failures,
- Analysis of Dynamic Events: Collision, Impact, Fire and Explosion,
- Slips, Trips and Falls: Safety Standards in Premises Liability,
- Safety Engineering: Guarding and Warning Standards, Human Factors,
- Industrial Equipment Failures, Forensic Engineering Investigation

EDUCATION:

MBA, 1999: College of Business Administration, Texas Tech University.

Ph.D., 1987: Department of Mechanical Engineering, **L**ouisiana **S**tate **U**niversity (**LSU**). **Dissertation Title:** "*Experimental and Finite Element Study of Residual Stresses Induced by Non-homogeneous, Large Deformation Manufacturing Processes: Application to Zircaloy-4(R) Nuclear Fuel Cladding and Oxygen-Free High Conductivity (OFHC) Copper Tubes*."

B.S./M.S. 1981/1984: Department of Mechanical Engineering, **L**ouisiana **S**tate **U**niversity (**LSU**). **Thesis Title:** "*The Effect of Imperfect Contact Between Adjacent Layers on the Integrity of Multilayer Wrapped Pressure Vessels with Interlayer Gaps*."

Dr. Jahan Rasty 806-368-9811 www.ExpertEngineering.com

PROFESSIONAL AFFILIATIONS:

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- The **A**merican **S**ociety of **S**afety **E**ngineers (**ASSE**) – Member
- **S**ociety for **E**xperimental **M**echanics (**SEM**) - Member
- **A**merican **S**ociety of **M**aterials (**ASM** International) – Member
- The **S**ociety of **A**utomotive **E**ngineers (**SAE** International) – Member
- **E**lectronic **D**evice **F**ailure **A**nalysis **S**ociety (**EDFAS**) – Member
- **N**ational **A**ssociation of **F**ire **I**nvestigators (**NAFI**) – Member
- **N**ational **A**ssociation of **C**orrosion **E**ngineers (**NACE**) – Member
- **S**ociety of **A**utomobile **E**ngineers (**SAE**) International- Member
- **I**nternational **I**ron & **S**teel **S**ymposium 2015 (**IISS**) – Scientific Committee Member

PROFESSIONAL CERTIFICATIONS:

2014: Successfully completed the National Association of Fire Investigators ***Certified Fire & Explosion Investigator (CFEI) Certification*** Course, July 21-24, 2014, Sarasota, FL.

2014: Successfully completed the National Association of Fire Investigators ***Certified Fire Investigation Instructor (CFII) Certification*** Course, July 25, 2014, Sarasota, FL.

2007: Successfully completed the Vetronix/Bosch approved standardized 8-hour ***Crash Data Retrieval (CDR) Technician Certification*** Course, September 9, 2007, North Las Vegas, NV.

2007: Successfully completed the Vetronix/Bosch approved 32-hour Crash Data Retrieval (CDR) Data Analyst Course to qualify for individual ***CDR System Operator Certification***, September 10-13, 2007, North Las Vegas, NV.

ACADEMIC ACHIEVEMENTS AND AWARDS:

2015: **Course Coordinator, Texas Tech University Department of Mechanical Engineering**

2010: **Texas Tech University Edward E. Whitacre Jr. College of Engineering Honors Convocation** – in recognition of receiving student nominations as a "Most Influential Professor" in 2009.

2002-05: **The American Society of Mechanical Engineers (ASME) International, Board of Governors** – Served as the regional secretary.

2002: **The American Society of Mechanical Engineers (ASME) International, Board of Governors –** in recognition for "valued service in advancing the engineering profession as Assistant Vice President for Education (1999-2001) and Vice Chair for Education (1998-1999)."

2002: **Texas Tech American Society of Mechanical Engineers (ASME) Student Chapter Service Award** – in recognition of 13 years of service as the Faculty Advisor for the ASME chapter.

2001: **The American Society of Mechanical Engineers (ASME) International Meritorious Service Award** – in recognition for his efforts in coordinating the Graduate Student Technical Conference (GSTC).

1993: **Halliburton Education Foundation** Award of Excellence for Outstanding Achievement and Professionalism in Education, Research and Service,

1992: **The American Society of Mechanical Engineers (ASME) International** Counsel on Member Affairs Award for outstanding contributions as the Faculty Advisor to the ASME Student Section at Texas Tech,

1992: **Ralph Teetor** award for education/research, **S**ociety of **A**utomotive **E**ngineers,

1991: **The American Society of Mechanical Engineers (ASME) International** Board of Governors award for valued services in advancing the engineering profession.

1990: **Halliburton Education Foundation** Award of Excellence for Outstanding Achievement and Professionalism in Education, Research and Service,

1989: **Alcoa Foundation** Grant Award for Excellence in Research,

1986: **A**merican **P**ublic **W**orks **A**ssociation (**APWA**) Grant Award,

1984-87: **Kaiser Aluminum** and Chemical Company Fellow in Materials Science,

WORK EXPERIENCE:

1986-Present: **Real-World Forensic Engineering**

President
Performed engineering analysis and provided expert witness testimony and consulting services in the areas of Forensic Engineering, Mechanical Design, Failure Investigation, Stress Analysis, Materials Characterization/Testing, and Experimental Engineering Analysis for a number of local as well as national corporations.

1/85-7/85: **ETHYL Corp., Baton Rouge, Louisiana**.
Project Engineer
Evaluated the stresses and displacements of reactor vessels under operating conditions and recommended modifications in the design of the vessels. Analysis was conducted using the existing theoretical solutions. In addition, ANSYS Finite Element Program was utilized to verify the theoretical results. Due to complex geometry of reactor parts being analyzed, extensive experience in modeling of mechanical parts with complex geometry and boundary conditions was obtained.

ACADEMIC AND PROFESSIONAL EXPERIENCE:

Director, Materials Performance and Failure Analysis Laboratory.

Director, Applied Forensic Engineering Graduate Certificate Program. (December 15, 2015 - Present).
Applied Forensic Engineering Graduate Certificate Program

2008-Present **Full-Professor**, Department of Mechanical Engineering, Texas Tech University
1993-2008: **Associate Professor,** Department of Mechanical Engineering, Texas Tech University
1988-1993: **Assistant Professor,** Department of Mechanical Engineering, Texas Tech University

Taught and Developed **(******)** the Following Undergraduate and Graduate Courses:

1) Mechanics of Solids, ME 3403
2) Mechanics of Solids (ME 3464, Mechanics II)
3) Principles of Failure Analysis & Forensic Engineering **(******)**, TTU-ME 4342
4) Mechanical Metallurgy **(******)**, TTU-ME 4343
5) Materials Science, TTU-ME 2311
6) Statics, TTU-ME 2464
7) Measurements & Instrumentation Laboratory – ME 3218
8) Materials and Mechanics Laboratory, TTU-ME 3328
9) Materials in Design (****)**, TTU-ME 4341
10) Manufacturing Processes **(******)**, TTU-ME 4344
11) Dynamics, TTU-ME 3331
12) Introduction to Machine Design, TTU-ME 3364
13) Machine Component Design, TTU-ME 3365
14) Advanced Topics in Mechanical Engineering: Safety Engineering, 1 course, ME 4330
15) , Individual Study in Mechanical Engineering: Energetic Material Combustion I, 3 courses, ME 4331
16) Mechanical Systems Laboratory, TTU-ME 4252
17) Applied Mechanics **(******)**, TTU-ME 4362
18) Senior Design-I, TTU-ME 4370
19) Senior Design-II, TTU-ME 4371
20) Individual Studies, TTU-ME 4331
21) Fracture and Failure Analysis **(******)**, TTU-ME 5342 (graduate)
22) Foundations of Solid Mechanics **(******)**, TTU-ME 5352 (graduate)
23) Plasticity and Viscoelasticity **(******)**, TTU-ME 5353 (graduate)
24) Theory of Thermal Stresses **(******)**, TTU-ME 5344 (graduate)
25) Deformation Mechanics **(******)**, TTU-ME 5331 (graduate)
26) Dislocation Mechanics **(******)**, TTU-ME 5343 (graduate)
27) Master's Thesis, 11 courses, ME 6300 (graduate)
28) Master's Report, 9 courses, ME 6301 (graduate)
29) Legal Principles in Forensic Science & Engineering (**), TTU-ME 6330 (graduate)

PROFESSIONAL DEVELOPMENT COURSES:

2016: Attended a full day workshop sponsored by NAFE *"**Application of Engineering in the Jurisprudence System**",* presented by NAFE, June 25, 2016, Dallas, TX

2016: Attended a full day Seminar *"**Structural Forensic Engineering**",* presented by Jarrod C. Burns, M.S., P.E., January 25, 2016, Lubbock, TX

2009: Attended a full day workshop and hand-on training course for *"**Safe Operation of Forklifts**",* presented by office of Environmental Health and Safety, Texas Tech University, May 2009, Lubbock, TX.

2008: Attended a 1½ day workshop on "***Intellectual Property in the 21st Century***", given by Raymond Van Dyke, Esq., an intellectual property attorney from the law firm of Winston & Strawn, LLP, in Washington D.C., April 11-12, 2008, Texas Tech University.

2007: Attended a workshop sponsored by ABAQUS Corporation on "***Computer Aided Modeling and Application of Finite Element Method to Fracture and Failure Analysis***", May 11-12, Dallas, TX.

2006: Attended a workshop sponsored by ABAQUS Corporation on "***Computer Aided Modeling and Application of Finite Element Method to Fracture and Failure Analysis***", May 11-12, Dallas, TX.

2002: Attended the American Society of Mechanical Engineers (ASME International) Management Training Seminar, August 10, 2002, San Antonio, TX.

1997: Successfully completed a course on ***"Interpersonal Skills"*** at the ASME Region X Management Training Seminar held, April 4-5, 1997, Arlington, TX.

1997: Successfully completed a course on ***"Mutil-Scale Modeling of Polycrystal Plasticity"*** at the Institute for Mechanics and Materials Seminar, April 9-11, 1997, San Diego, CA.

1993: Successfully completed a course on "***Teaching Effectiveness***" presented at the National Effective Teaching Institute's workshop held at the University of Illinois at Urbana-Champaign, June 24-26, 1993.

1990: Successfully completed a course on "***Probabilistic Structural Analysis Methods and NESSUS Workshop***" presented by the Southwest Research Institute, San Antonio, Texas, April 16-20, 1990.

1989: Successfully completed a course on ***"Integrated Learning System - Improving Engineering Education,***" Presented by Dr. K.J. Williamson, and P.K. Hurt, in a teaching effectiveness workshop held at Texas Tech University.

1988: Successfully completed a course on "***Creating Creative Engineers***", presented at the National Effective Teaching Institute's workshop held at North Carolina State University, June 11-13, 1988.

1984: Successfully completed a course on "***Teaching Effectiveness***" presented by Professor James E. Stice, at the Center for Teaching Effectiveness Workshop, held at Louisiana State University, March15-17, 1984.

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ENGINEERING RESEARCH & PROJECT MANAGEMENT EXPERIENCE:

1988-Present: Department of Mechanical Engineering, Texas Tech University, Lubbock, TX

Funded Research:

Served as the PI and/or Co-PI of 27 research projects (listed below) with a total funding of $7,478,820 (Other non-funded research projects are not listed).

1) Rasty, J. (Principal), "Curriculum Modules for Nuclear Eng.: Corrosion and Radiation Effects on Electronic Materials," Sponsored by NRC/University of Kansas, Federal, $25,000.00. (April 1, 2012 - March 30, 2014).

2) Maxwell, T. (Co-Principal), Tate, D. (Principal), Rasty, J., "Study and Improve the Hall Pump," Sponsored by T&B Financial Services, $13,939.00. (September 2010 - December 2011).

3) Principal-Investigator: "Experimental and Finite Element Characterization of Residual Stresses", Funded by AFOSR/Lockheed Martin/Boeing PCC 02 KY4111 F/A-22 Program, $5,000, 8/6/2007 – 5/31/2007.

4) Principal-Investigator: "Property Characterization of Biodegradable Insulation Material," Funded by MXT Corp., $3,956, 03/13/2006 – 3/13/2007.

5) Principal-Investigator: "Development of Residual Stress Measurement Standards for Machining-Induced Distortion Failures", Funded by Los Alamos National Laboratory, $37,926, 01/15/2006 – 12/31/2006.

6) Principal-Investigator: "Numerical Analysis of High-Cycle Fatigue with Probabilistic Failure." Funded by Alpha Star Corporation, $170,000, 6/1/2005 – 5/31/2006.

7) Principal-Investigator: "Effect of Dietary Lipids on Flexural Strength and Histomorphometry of Osteoporotic Animal Bone Models". Funded by Texas Tech Multidisciplinary Seed Grant Program, $29,200, 4/01/2002- 8/01/2003.

8) Co-Investigator: "Two-year program extension, MURI-II, "Explosive-Driven Power Generation for Directed-Energy Munitions," Funded by Air Force Office of Scientific Research, $2,000,000, 5/01/2001- 5/01/2003.

9) Co-Investigator: "MURI II, Explosive-Driven Power Generation for Directed-Energy Munitions," Funded by Air Force Office of Scientific Research, $3,000,000, 5/01/98-5/01/2001.

10) Principal-Investigator: "Materials Testing System", Instron Corp., $27,320, 5/97.

11) Principal-Investigator: "Hydraulic Power Unit for Cold Expansion of Airplane Fuselage Rivet Holes", Womack Systems. L.C., $925, 10/96.

12) Principal-Investigator: "Improving Machining of Internally Stressed Components Through Model Predictive Control," Funded by the Pittsburgh Supercomputing Center, $8,000 9/96-9/97.

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13) Principal-Investigator: "Improving Machining of Internally Stressed Components Through Model Predictive Control," Funded by the Pittsburgh Supercomputing Center, $16,000 9/95-9/96.

14) Principal-Investigator: "Effective Control of Distortion and Residual Stresses Induced by Rapid Quenching" Funded by the Advanced Technology Program (ATP), Texas Higher Education Coordinating Board, $88,000, 1/96-1/98.

15) Principal-Investigator: "Design and Construction of a Scale Model 400-Ton Mechanical Press for Manufacturing Expanded Metal Grating. Funded by EMI Inc., $1,243, 8/94 - 12/94.

16) Principal-Investigator: "Achieving Optimum Material Properties While Minimizing Distortions due to Rapid Quenching," Funded by the Center for Applied Automation and Research (CFAR), $15,250, 11/93-11/94.

17) Co-Investigator: "Effect of Thermal Cycling and Space Conditions on the High Voltage Flash-Over of Dielectrics", Funded by Defense Nuclear Agency (DNA), $500,000, 1/93-1/94.

18) Co-Investigator: "Design and Manufacturing of Multi-Layered Spherical Pressure Vessels Using the Integral Hydro-Bulge Forming Method", Funded by College of Engineering, Texas Tech University, State Line Item Research Program, $23,500, 9/92-9/93.

19) Co-Investigator: "High-Voltage Space Power Research", Funded by Defense Nuclear Agency (DNA), $250,000, 1/92-1/93.

20) Co-Investigator: "Effect of Thermal Cycling and Space Conditions on the High Voltage Flash-Over of Dielectrics", Funded by Defense Nuclear Agency (DNA), $460,000, 1/92-1/93.

21) Principal-Investigator: "Composite Materials", Funded by W.G. Composites, $60,000, 12/91.

22) Co-Investigator: "Effect of Thermal Cycling and Space Conditions on the High Voltage Flash-Over of Dielectrics", Funded by Defense Nuclear Agency (DNA), $500,000, 1/91-1/92.

23) Principal Investigator: "Experimental Measurement of Residual Stresses Due to Non-uniform Cooling Following Heat Treatment Operation", Funded by Alcoa Technical Center, $10,000, 1/91-1/93.

24) Principal Investigator: "Ultrasonic-Based Measurement of Residual Stresses Induced by Large Deformation Manufacturing Processes", Funded by Engineering Foundation, a Department of Engineering Trustees Inc., $20,000, 9/90-9/91.

25) Principal Investigator: "Equipment for Ultrasonic-Based Measurement of Residual Stresses Induced by Large Deformation Manufacturing Processes", Funded by Texas Tech University, $24,000, 6/91-6/92.

26) Co-Investigator: "Avionics Integrity: Finite Element Analysis of LRUs and PCBs Subjected to Vibration and/or Thermal Environments", Funded by General Dynamics/FW, $100,000, 1/90-1/91.

27) Principal Investigator: "Physical and Numerical Modeling of Metal-Forming Processes", Alcoa Research Foundation, $7,500, 6/89-90.

28) Co-Investigator: "An Automated Video-Optical Diffractometry Technique for Measurement of Strain on Curved Surfaces", Funded by the Advanced Technology Program (ATP), Texas Higher Education Coordinating Board, $114,000, 6/88-9/90.

29) Co-Investigator: "Development of a Beam Pump Intelligent Well Controller: Measurement of Position, Displacement and Induced Forces", Funded by Teledyne Merla Inc., $7,000, 1/89-1/90.

College Service

Committee Member, College of Engineering Grade Appeal Board. (February 15, 2016 - Present).

Department Service

Committee Member, College of Engineering Grade Appeal Board. (February 1, 2016 - Present).

Committee Member, ABET Committee. (January 1, 2016 - Present).

Committee Chair, Undergraduate Laboratory Committee. (January 1, 2016 - Present).

Committee Chair, Materials & Mechanics Lab Course Coordinator. (January 1, 2015 - Present).

Committee Chair, Solid Mechanics (ME 3403) Course Coordinator. (January 1, 2012 - Present).

Committee Member, Department of Mechanical Engineering Web Page Committee. (January 1, 2015 - December 31, 2016).

Faculty Advisor, Research Advisor for 3 graduate students and 3 undergraduate students. (January 1, 2011 - February 1, 2014).

Faculty Mentor, Faculty Mentor to Changdong Yeo. (January 1, 2012 - January 1, 2014).

Committee Member, Faculty Search Committee. (January 1, 2012 - December 1, 2012).

Committee Member, Design position search committee. (November 1, 2011 - November 1, 2012).

Committee Member, Staff Award Committee. (October 1, 2012 - October 10, 2012).

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Committee Member, Faculty Awards Committee. (September 21, 2011 - September 21, 2012).

Committee Member, Search Committee. (January 1, 2011 - December 30, 2011).

Committee Member, ABET Review Committee. (January 1, 2010 - February 1, 2011).

Committee Chair, Faculty Retreat. (January 10, 2010 - December 10, 2010).

Committee Chair, Strategic Planning. (September 1, 2009 - December 10, 2010).

Committee Member, Faculty Search - Control Position. (January 10, 2010 - August 10, 2010).

Public Service

Guest Speaker, National Academy of Forensic Engineers (NAFE), Miami, FL. (January 1, 2013 - Present).

Guest Speaker, Texas Trial Lawyers Association, Lubbock, TX. (October 6, 2013).

Research in Progress

"Assessment of Damage in Hail Impacted Galvanized Steel" (On-Going).

"Characterization of Crack Initiation and Propagation in Polymer Matrix Composites (PMC's)" (Complete).

"Development of a Novel Technique for Measurement of Residual Stresses" (On-Going).

"Effect of Drilling Speed on Residual Stress Measurements Utilizing the Hole-Drilling Technique" (Complete).
A parametric study of various drilling speeds and how it affects Residual Stress Measurements in Metallic Materials

"Failure Analysis & Performance Characterization of Wind Tower Bolts" (On-Going).

"Fracture & Damage Analysis" (Complete).
Formulation of Damage Characteristics in Composite Materials

"Measurement of Dynamic Coefficient of Friction and Effect of Surface Treatments" (On-Going).

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"Nondestructive Evaluation of Fatigue Crack Propagation" (Complete).

"Environmental-Assisted Degradation of Polymeric Webbing" (On-Going). (January 1, 2014 - Present).
This project is a study of the effect of outdoor exposure, including UV radiation, temperature and humidity, on mechanical properties of polymeric webbing materials.

"Development of Speckle Interferometry Setup for Residual Stress Measurement and Flaw Detection" (On-Going). (September 1, 2013 - Present).
Collaborations with Los Alamos National Lab Researchers led to acquisition of Speckle Interferometry equipment for measurement of Residual Stresses, flaw/crack detection of up to 200 nm resolution. This equipment is commercially available for close to $100K, but was obtained free of charge and is currently operating in the Materials Characterization and Failure Analysis Lab in Mechanical Engineering Dept.

"Corrosion Resistance Characterization of Damaged Galvanized Steel" (On-Going). (October 1, 2012 - Present).
Effect of mechanical surface damage to the galvanized layer in galvanized steel panels is being studied via controlled damage followed by accelerated corrosion tests in a newly developed corrosion chamber.

"Effect of Surface Texture on Dynamic Coefficient of Friction of Tile Surfaces" (Complete). (May 1, 2012 - June 1, 2013).
Surface Texture of tile surfaces used as walking surfaces are affected by the type of tile as well as the type of surface treatments commonly used for cleaning such surfaces. A parametric study was performed to measure the Dynamic Coefficient of Friction on various tiles treated via 5 commercially available cleaning treatments.

"Failure Characterization of Bolts Utilized in Construction of Wind Turbine Towers" (Complete). (January 1, 2013 - May 1, 2013).
Bolts used in construction of wind turbine towers are susceptible to failure via fatigue and/or overload. The objective of this study was to determine the relative strength of three different types of bolts being considered and quantification of their resistance to fatigue and overload failures.

"Failure Characterization of Polymeric Support Structures Subjected Cyclic Loading" (Complete). (October 1, 2012 - May 1, 2013).
Polymeric load bearing support structures are routinely used due to their high strength to weight ratio. This study focuses on characterizing surface features on specimens fractured via cyclic loading and comparison of these features with fracture features obtained via static overload as well as dynamic loading.

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Directed Student Learning

Noah Reyes, Directed Individual/Independent Undergraduate Study, "Simulation of Damage in Marine Vessel Crashes," Mechanical Engineering. (August 28, 2016 - Present).

Allen Henley, Directed Individual/Independent Undergraduate Study, "Experimental Simulation of Damage in Composite Materials used In Marine Vessels," Mechanical Engineering. (August 26, 2016 - Present).

Tyler Crupper, Directed Individual/Independent Undergraduate Study, "Experimental Simulation of Damage in Composite Materials used In Marine Vessels," Mechanical Engineering. (August 26, 2016 - Present).

Mehzubh Bismi, Directed Individual/Independent Graduate Study, "Experimental Simulation of Damage in Composite Materials used In Marine Vessels," Mechanical Engineering. (August 1, 2016 - Present).

Adrain Reyes, Directed Individual/Independent Undergraduate Study, "Experimental Simulation of Damage in Composite Materials used In Marine Vessels," Mechanical Engineering. (August 1, 2016 - Present).

Cesar Barras, Directed Individual/Independent Undergraduate Study, "Experimental Simulation of Damage in Composite Materials used In Marine Vessels," Mechanical Engineering. (August 1, 2016 - Present).

Chance Logan, Directed Individual/Independent Undergraduate Study, "Experimental Simulation of Damage in Composite Materials used In Marine Vessels," Mechanical Engineering. (August 1, 2016 - Present).

Vlad Coltisor, Directed Individual/Independent Undergraduate Study, "Experimental Simulation of Damage in Composite Materials used In Marine Vessels," Mechanical Engineering. (August 1, 2016 - Present).

Jacob Jinojos, Directed Individual/Independent Undergraduate Study, "Metallurgical Analysis of Damage due to Hail Impact," Mechanical Engineering. (May 1, 2016 - Present).

Grant Gowdy, Directed Individual/Independent Undergraduate Study, "Corrosion Failure of Steel Guy Wires for Support of Gas Flare Stacks," Mechanical Engineering. (December 1, 2015 - Present).

Graham Walker, Other, "Safety Consideration in Forensic Engineering," Mechanical Engineering. (September 1, 2015 - Present).

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Saeed Babamohammadi, Doctoral Advisory Committee Chair, "Experimental & Numerical Investigation of Impact Damage to EPDM/Adhesive Interface," Mechanical Engineering. (January 1, 2015 - Present).

Vikram Chavan, Directed Individual/Independent Graduate Study, "Safety Engineering," Mechanical Engineering. (January 1, 2016 - December 15, 2016).

Oyebode Adeyi, Supervised Research, "Effect of Hail Impact Damage on Corrosion Resistance of Galvanized Steel," Mechanical Engineering. (September 1, 2015 - December 15, 2016).

Chandrasekhar Meduri, Undergraduate Research, "Effect of Hail Damage on Corrosion Resistance of Galvanized and Galvalume Steel," Mechanical Engineering. (September 1, 2015 - December 15, 2016).

John Adeyi, Undergraduate Research, "Effect of Hail Damage on Corrosion Resistance of Galvanized and Galvalume Steel," Mechanical Engineering. (September 1, 2015 - December 15, 2016).

Kevin Ton-That, Undergraduate Research, "Effect of Hail Damage on Corrosion Resistance of Galvanized and Galvalume Steel," Mechanical Engineering. (September 1, 2015 - December 15, 2016).

Matthew Millican, Undergraduate Research, "Effect of Hail Damage on Corrosion Resistance of Galvanized and Galvalume Steel," Mechanical Engineering. (September 1, 2015 - December 15, 2016).

Casey Henderson, Undergraduate Research, "Modeling of Stresses in Cylindrical Water TankConstruction," Mechanical Engineering. (June 1, 2015 - December 15, 2016).

April Logan, Supervised Research, "Environmental Degradation of Polymeric Fabrics," Mechanical Engineering. (January 1, 2015 - December 15, 2016).

April Logan, Undergraduate Honors Thesis, "Ultraviolet & Environmental Degradation of Polymeric Fibers," Mechanical Engineering. (January 1, 2015 - December 15, 2015).

Pawan Maharjan, Master's Thesis Committee Chair, "Measurement of Residual Stresses via Holographic Interferometry and Hole Drilling Method," Mechanical Engineering. (September 1, 2013 - May 1, 2015).

Neil Kanungo, Master's Thesis Committee Chair, "Ultraviolet and Environmental Degradation of Polymeric Fabrics," Mechanical Engineering. (January 1, 2013 - May 1, 2014).

Andrew Schmit, Master's Thesis Committee Chair, "Effect of Helmet Design on Reduction of Head Injury in Footbal," Mechanical Engineering. (June 1, 2012 - May 1, 2014).

Kaushik Das, Dissertation Committee Chair, "Application of Experimental and Finite Element Techniques in Residual Stress Measurement," Mechanical Engineering. (December 1, 2011 - December 1, 2012).

Yasamin Nikour, Dissertation Committee Chair, "Experimental and Finite Element Characterization of Fracture Mechanics in Brittle Materials used for Grinding Operations," Mechanical Engineering. (August 26, 2010 - August 1, 2012).

Clayton Moore, Master's Thesis Committee Chair, "Small Fatigue Crack Detection using Phased Array Technology," Mechanical Engineering. (August 26, 2010 - May 1, 2012).

Evan Shimek, Master's Thesis Committee Chair, "Assessment of Damage in Hail Impacted Galvanized Steel," Mechanical Engineering. (January 1, 2009 - December 30, 2011).

David Upshaw, Master's Thesis Committee Chair, "Effect of Drilling Speed on Residual Stress Measurements Utilizing the Hole-Drilling Technique," Mechanical Engineering. (June 1, 2009 - May 30, 2011).

Daniel Steves, Master's Thesis Committee Chair, "Mechanical Performance of Tungsten Inert Gas Welded Aluminum Alloy 6061-T6," Mechanical Engineering. (August 26, 2009 - December 10, 2010).

GRADUATE STUDENT SUPERVISION (Incomplete List)

Student's Name	**Degree Earned**	**Thesis/Dissertation Title**
Daniel Stevens (Committee Chair)	M.S.- M.E. In Progress	"A new Apparatus for Measurement of Residual Stresses Utilizing Hole-Drilling Method"
Mike Tiprigan (Committee Chair)	M.S.- M.E. In Progress	"Experimental Study of Failure in High-Pressure Hoses"
Sharath Neelakanta (Committee Chair)	M.S.- M.E. In Progress	"Experimental Study of Hail Impact Damage on Roofing Materials"
Spandan Archa (Committee Chair)	M.S.- M.E. In Progress	"Analysis of Residual Stresses via Hole-Drilling and Contour Methods"
Raja Gudipati	M.S.- M.E.	"Effect of Acid Cleaning on Fractographic

(Committee Chair)	In Progress	Features in Typical Fracture Surfaces"
Dhananjay Ghatpande (Committee Chair)	M.S.- M.E. In Progress	"Experimental studty of the Energy Absorption Characteristics of Footbal Helmets"
Archis Marathe (Committee Chair)	M.S.- M.E. In Progress	"Failure Analysis of Synthetic Ropes"

GRADUATE STUDENT SUPERVISION (Incomplete List)

Student's Name	**Degree Earned**	**Thesis/Dissertation Title**
Amit Kumar (Committee Chair)	M.S.- M.E. In Progress	
Andrew Schmit (Committee Chair)	M.S.- M.E. May 2014	"Effect of Bladder Pressure on Energy Absorption Characteristics of Football Helmets"
Neil Kanungo (Committee Chair)	M.S.- M.E. May 2014	"Environmental Degradation of Polymeric Webbing Materials, Effects of UV, Heat and Humidity"
Zack Branson (Committee Chair)	B.S.- M.E. December 2013	"Root-Cause Failure of a Polyurethane Chair"
Neil Kanungo (Committee Chair)	M.S.- M.E. December 2011	"Analysis of Damage to Galvanized Steel Due to Hail Impact"
David Upshaw (Committee Chair)	M.S.- M.E. May 2011	"Finite Element Study of Collision Impact"
Hutcheson, Stephen (Committee Member)	Ph.D.- CHEE, August 2008	Evaluation of Viscoelastic Materials: The Study of Nanosphere Embedment into Polymer Surfaces and Rheology of Simple Glass Formers Using a Compliant Rheometer
Dhorje, Mrugesh (Committee Member)	M.S. – M.E. August 2008	Application of Modified Weibull Failure Theory For Contact Loading
Ramkumar (Committee Chair)	Ph.D. - M.E. Dec. 2007	"High Strain-Rate and High Temperature-Rate Characterization of of Material Properties"
Nathan Poerner (Committee Chair)	M.S. – M.E. Dec. 2007	"Round-Robin Study of Residual Stress Measurement Techniques"
Vipin Palande (Committee Chair)	M.S. – M.E. May 2009	"3-D Finite Element Analsysi of residual Stress in Cold Expanded Holes"
Gautam Kumar (Committee Chair)	M.S.- M.E May 2005	"Failure Analysis of an Engine Bearing Cap".

Xiabin Le (Committee Chair)	Ph.D. – M.E.	"Experimental and Finite Element Analysis of Explosive Loading in MFCGs"
Nripendue Dutta (Committee Chair)	Ph.D. – M.E.	"Experimental and Finite Element Analysis of Elasto-Palstic Boundary in Cold Expanded Holes"
Ali Raja (Committee Chair)	M.S.- M.E.	"Experimental Study of Bending Fracture Stress of Rat Bones Subjected to Different Diets"

Advisor to Doctoral Dissertations and Masters Thesis Research Projects: (Incomplete List)

Student's Name	Degree Earned	Thesis/Dissertation Title
Nripendu Dutta	Ph.D.- M.E. 1997	"Analytical, Numerical, and Experimental Investigations of Elastic-Plastic Boundary and Residual Stress Field around a Cold-Expanded Hole"

PROFESSIONAL SERVICES:

2006-2007 **10th World Conference on Integrated Design & Process Technology,** May 27- June 1, 2007, Antalya, Turkey, Member of program committee, served as session organizer and reviewer.

2005: **National Science Foundation Grant Review Panel**
Served as a reviewer for NSF's Division of Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs covering the topics of Manufacturing and Machine Design.

2001-Present: **Secretary - ASME Great International Region X**
Responsibilities included serving on ASME-Region X Operating Board and assisting the VP with the operation of region X activities.

1998-2001: **Assistant VP for Education – ASME Great International Region X**
Responsibilities included serving on ASME-Region X Operating Board covering more than 50 universities in 4 states and two countries, organization of the annual ASME Regional Student Conference (RSC), Graduate Student Technical Conference (GSTC), Design Contest, as well as organization of the annual Regional Student Leadership Seminar (RSLS) for training of incoming ASME student officers.

1991-Present: **ASM/TMS Student Chapter Faculty Adviser,**
Department of Mechanical Engineering, Texas Tech University.
Founded the first joint student chapter of the American Society of Materials and The Metallurgical Society (**ASM/TMS**) at Texas Tech University.

1989-2002: **ASME Student Chapter Faculty Adviser,**
Department of Mechanical Engineering, Texas Tech University.
Provided support and guidance to the local student chapter of the American Society of Engineers.

1998: **Society for Experimental Mechanics (SEM) Session Chairman,**
Served as the chairman for a session on "Application of Numerical Modeling to the Analysis of Residual Stresses" at the SEM's 1998 Spring Conference, June 2-4, 1998, Houston, Texas.

1997: **National Science Foundation Advisory Panel**
Served as an NSF advisory panelist for the Individual Investigator Award (IIA) proposals in the Mechanics and Materials program in the Division of Civil and Mechanical System, June 9 and 10, 1997.

1995-1996: **Soc. for Design and Process Sci. (SDPS) Conference Symposium Developer,**
Served as the "Materials" Symposium Chairman. Organized the "Materials" symposium at the SDPS's Second World Conference on Integrated Design & Process, held December 1-4, 1996, Austin, Texas.

1995-1996: **ASME Conference Symposium Developer,**
Served as the U.S. Symposium Chairman. Organized the "Manufacturing" symposium at the ASME's Third European joint conference on Engineering Systems Design and Analysis (ESDA), held July 1-4, 1996, Montpellier, France.

1993-1994: **ASME Conference Session Developer,**
Served as a session developer. Organized and developed a session in "Plasticity" at the ASME's Second European joint conference on Engineering Systems Design and Analysis (ESDA), held July 4-7, 1994, London, England.

1992-1994: **Society for Experimental Mechanics, Residual stress Committee**.
Served on the SEM Residual Stress Committee and helped with the organization of conference sessions, publications, and workshops.

1993: **Society for Experimental Mechanics Conference Session Developer,**
Organized and chaired a sponsored session on the "Application of Numerical Methods to the Analysis of Residual Stresses," for the 50th Annual Spring Conference of the Society for Experimental Mechanics, June 5-12, 1993, Dearborn, Michigan.

1992: **ASME Conference Session Developer,**
Served as a session developer. Organized, developed and chaired a session in "Plasticity" at the ASME's first European joint conference on Engineering Systems Design and Analysis (ESDA), June 29-July 4, 1992, Istanbul, Turkey.

1988-1989: **SAE Project Faculty Co-Adviser,**
Department of Mechanical Engineering, Texas Tech University.
Assisted in the organizing of the **SAE** National Walking Machine Decathlon Contest, held at Texas Tech in April, 1989. This is an annual robotics competition aimed at promoting interdisciplinary cooperation among undergraduate engineering students from ME, CE, EE, and CS Departments.

1991-1997: Adopt-a-Classroom Project. Assisted local high schools with engineering-related design projects and competitions that help promote the field of engineering.

1991-1993: Member of the Board of Directors of Lubbock Tennis Association (LTA).

1989-1990: Volunteer judge at the **"Math Count"** competition among local schools.

PATENTS:

1. Trafton Rodgers, Jahan Rasty, Trae Blain, Neal St. Martin, Walter Fagley and Kurt W. Niederer, ***Adjustable Toilet Lift***, Patent Number 8800074, Issued August 12, 2014.

SCIENTIFIC PUBLICATIONS:

1. Rasty, J., National Academy of Forensic Engineers Winter Annual Meeting, "Forensic Engineering Analysis of Factors Contributing to the Explosion of Table Torch," New Orleans, LA. (January 11, 2017).

2. Rasty, J., Adeyi, J., Millican, M., Meduri, C., Ton-That, K., Adeyi, O. *Effect of Hail Impact Damage on the Corrosion Behavior of Roofing Grade Galvanized and Galvalume Steel*. Vancouver: National Association of Corrosion Engineers (NACE) Annual Conference 2016.

3. Rasty, J., Logan, A. (2015). *Ultraviolate and Environmental Degradation of Polymeric Fabrics*. Posters on The Hill, Washington D.C..

4. Rasty, J., "A Forensic Engineering Investigation of Failure in Hunting Treestands," National Academy of Forensic Engineers, Newport Beach, CA. (January 20, 2013).

5. Rasty, J. (Presenter & Author), National Academy of Forensic Engineers, "Experimental and Computer-Aided Assessment of Damage to Galvanized Steel due to Hail Impact," NAFE, Miami, FL. (January 5, 2012).

6. SHIMEK, E., Ekwaro-Osire, S., Rasty, J. (2011). *Probabilistic Analysis of Steel Roof Damage from Hail Strike*. Proceedings of the 2011 ASME International Mechanical Engineering Congress & Exposition, Denver, Colorado, Nov 11–17, 2011.

7. Jahan Rasty and Archis Marathe, “Effect of Material Composition and Failure Mode on Treatment of Corroded Fracture Surfaces for Optimal Fractography,” Accepted for presentation at the ASME International Mechanical Engineering Congress & Exhibition, November 12-18, 2010, Vancouver, British Columbia.

8. Dutta, N., and Rasty, J., “Prediction of Elastic-plastic Boundary around Cold-expanded Holes Using Elastic Strain Measurement”, J. of Materials Engineering Technology (accepted).

9. Xiaobin Le and Jahan Rasty, “A probabilistic Approach to Determination of Component Dimensions under Fatigue Loading,” Proceedings of ASME 2009 International Design Engineering Technical Conferences, IDETC, August 30-September 2, 2009, San Diego, CA.

10. Rasty J., Le, X., Palande, V., "Does Hail Damage Constitute Material Failure? An Experimental and Finite Element Study of Hail-Induced Damage in Metallic Roofing Materials", Journal of Engineering Failure Analysis (accepted).

11. Baydogan, M., Cimenoglu, E., Kayali, S.,and Rasty, J., "Improved Resistance to Stress-Corrosion Cracking Failures via Optimized Retrogression and Re-Aging of 7075-T6 Aluminum Sheets, Journal of Metallurgical Transactions A, Volume 39, Number 10, October, 2008, pp. 2470-2476.

12. Nathan Poerner, Jahan Rasty and Mike Steinzig, "Round Robin Study of Residual Stress Measurement Techniques," 3rd International Residual Stress Summit, October 2-4, 2007, Oak Ridge National Laboratory, Oak Ridge, TN.

13. Nathan Poerner, and Jahan Rasty, "Effect of Cutting Method on Residual Stress Measurement via Slitting Technique," Society for Experimental Mechanics (SEM) Annual Conference, June 3-6, 2007, Springfield, Massachusetts.

14. Shen, C.L, Yeh, J.K., Rasty, J., Chyu, M.C., Dunn, D.M., Li, Y., Watkins, B.A., "Improvement of Bone Quality in Gonad-Intact Middle-Aged Male Rats by Long-Chain n-3 Polyunsaturated Fatty Acid", J. of Calcification Tissue International, Vol. 80, April 2007, , pp 286-293.

15. Rasty, J., Le X.., Baydogan, M., and Cardenas-Garcia, J.F., "Measurement of Residual Stresses in Nuclear-grade ZR-4(R) Tubes: Effect of Heat Treatment," Journal of Experimental Mechanics, Vol.47, Issue 2, Apr. 2007, pp. 185-199.

16. R. Srinivasan,, and J. Rasty, "Prediction and Measurement of Residual Stresses in Extruded and Drawn Rods and Tubes," The Minerals, Metals & Materials Society (TMS) 2007 Annual Meeting & Exhibition, February 25 – March 1, 2007, Orlando, Florida.

17. Yanzhang Ma, Jianjun Liu, Chun-Xiao Gao, Allen White, W. N. Mei, and Jahan Rasty, "High-pressure X-ray diffraction study of the giant dielectric constant material CaCu3Ti4O12: evidence of stiff grain surface", Applied Physics Letters, Vol. 88, 191903, May 2006.

18. Chwan-Li Shen, James K. Yeh, Jahan Rasty, Yong Li, and Bruce A. Watkins, "Protective effect of dietary long chain n-3 PUFA on bone loss in intact middle-aged male rats," British Journal of Nutrition, Vol. 95, No. 3, March 2006, pp. 462-468.

19. J. Rasty, and X. Le, "Does Hail Damage Constitute Material Failure? An Experimental and Finite Element Study of Hail-induced Damage in Metallic Roofing Materials," 2nd International Conference on Engineering Failure Analysis (ICEFA-II), September 13-15, 2006, Toronto, Canada.

20. J. Rasty, A. Ertas, and R. Couvillion, Editors, "Proceedings of the 4th Joint ASME/SDPS International Graduate Student Technical Conference", April 7-8, 2006, Fayetteville, Arkansas.

21. J. Rasty, and H. Sari-Sarraf, "Application of X-Ray Tomography, Light and Scanning Electron Microscopy to Failure Analysis of a Fill-Valve Coupling Nut," 2nd International Conference on Engineering Failure Analysis (ICEFA-II), September 13-15, 2006, Toronto, Canada.

22. Murat Baydoğan, Hüseyin Çimenoğlu, E. Sabri Kayalı, and Jahan Rasty, "Effect of Retrogression and Re-aging Treatment on Stress Corrosion Cracking Resistance of 7075 Aluminum Alloy", Proceedings of the 135th TMS (The Minerals, Metals & Materials Society) Conference, March 12-16, 2006, San Antonio, TX.

23. Yanzhang Ma, Jianjun Liu, Chun-Xiao Gao, Allen White, W. N. Mei, and Jahan Rasty, "High-pressure X-ray diffraction study of the giant dielectric constant material CaCu3Ti4O12: evidence of stiff grain surface", 2006 American Physical Society (APS) March Meeting, March 13–17, 2006; Baltimore, MD.

24. J. Rasty, M. Baydogan, K. Ramkumar, I. Rivero, and J.F. Cardenas-Garcia, "Measurement of Residual Stresses in Nuclear-Grade Zircaloy–4(R) Tubes – Effect of Heat Treatment," 2nd Residual Stress Summit, Vancouver, Canada, August 10-12, 2005.

25. P. Worsey, J. Baired, and J. Rasty, Book Section: "Mechanical Aspects," Explosively Driven Pulsed Power – Helical Magnetic Flux Compression Generators, Springer Publishing, 2005, pp. 53-125.

26. J. Rasty, A. Ertas, and R. Couvillion, Editors, "Proceedings of the Third Joint ASME/SDPS International Graduate Student Technical Conference", March 31- April 2, 2005, Lubbock, TX

27. K.V. Ramkumar, and J. Rasty, "Effect of Combined Corrosion and Residual Stress on Fatigue Failure", proceedings of the 2004 Society for Experimental Mechanics (SEM) X International Congress, June 7-10, 2004, Costa Mesa, California.

28. J.F. Cardenas-Garcia, and J. Rasty, "The Indentation Test Revisited: Obtaining Poisson's Ratio", proceedings of the 2004 Society for Experimental Mechanics (SEM) X International Congress, June 7-10, 2004, Costa Mesa, California.

29. J. Rasty, A. Ertas, and R. Couvillion, Editors, "Proceedings of the Second Joint ASME/SDPS International Graduate Student Technical Conference", March 25-27, 2004, Longview, TX.

30. Chawn-Le Shen, Dale M. Dunn, James, K. Yeh, Bruce A. Watkins, Yong Li, Ali Raja, and Jahan Rasty, "Dietary n-3 Polyunsaturated Fatty Acids Prevent Aging-induced Bone Loss in Male Rats." Presented at the Experimental Biology Conference, Washington D.C., April 2004.

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32. J. Rasty, R. Couvillion, and A. Ertas, Editors, "Proceedings of the First Joint ASME/SDPS International Graduate Student Technical Conference", March 28-29, 2003, Houston, TX.

33. Jahan Rasty and Xiaobin Le, James Dickens, Andreas Neuber, and Magne Kristiansen, "Design Criteria for Prevention of Armature Turn-Skipping in Helical Magnetic Flux Compression Generators," Presented at the Pulsed Power Conference, Dallas, Texas, June 16-18, 2003.

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36. Barry J. Henry, MD, Mike Kenison, BS, Catherine McVay, PhD, Rial Rolfe, PhD, Suzanne Graham, MD, Jahan Rasty, PhD, James Slauterbeck, MD, Eugene J. Dabezies, MD, "The Effect of Local Hematoma Blocks on Early Fracture Healing," Feature Article in the Journal of Orthopedics, Vol. 25, No. 11, November 2002, pp. 1259-1262.

37. Rasty, J., Le, X., "Failure Analysis of the Rear Axles in a Sports Utility Vehicle (SUV)," Symposium on Failure Analysis and Prevention, 2001 ASME International Mechanical Engineering Congress & Exposition, New York, NY, November 11-16, 2001.

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41. Sofuoglu, H., Gedikli, H., Rasty, J., "Determination of Friction Coefficient by Employing the Ring Compression Test," ASME Transactions - Journal of Engineering Materials and Technology (JEMT), Vol. 123, issue 3, July 2001, pp. 338-348.

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44. Neuber, A., Dickens, J., Giesselmann, M., Freeman, B., Rasty, J., Le, X., Krompholz, H., and Kristiansen, M." Fundamental Studies of a Simple Helical Magnetic Flux Compression Generator," Proceedings of the 27th IEEE International Conference on Plasma Science, New Orleans, LA, June 4-7, 2000.

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46. Dutta, N., Rasty, J., "Determination of Elastic-plastic Boundary around Cold-expanded Holes Using Elastic Strain," Proceedings of the 1999 Society for Experimental Mechanics (SEM) Spring Conference, June 7-9, 1999, Cincinnati, Ohio.

47. Dutta, N., Rasty, J., and Rassaian, M., "Evolution of Internal Stresses in Co-Drawing Bimetallic Rods," Proceedings of the 1998 Society for Experimental Mechanics (SEM) Spring Conference, June 1-3, 1998, Houston, Texas.

48. Dutta, N., Rasty, J., and Rassaian, M. "Finite Element Analysis of Elastic-Plastic Zone Around Cold-Expanded Holes," Post-Conference Proceedings of the 1997 Society for Experimental Mechanics (SEM) Spring Conference, June 2-5, 1997, Bellevue, Washington, pp. 108-115.

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50. Rasty, J. and Sofuoglu, H., " On the Measurement of Friction Coefficient Utilizing the Ring Compression Test: Part II - Effect of Deformation Speed, Strain Rate and Barreling," Proceedings of the 1996 ASME European Joint Conference on Engineering Systems Design and Analysis (ESDA), Symposium on Manufacturing, July 1-4, 1996, Montpellier, France, PD-Vol. 75, pp. 189-197.

51. Bellet, M., Rasty, J., Editors, "Volume 3: Composite Materials, Manufacturing, Fatigue, and Fracture," ASME Engineering Systems Design and Analysis, ASME Publishing, 1996.

52. East, I.I., Veniali, F., Rasty, J., Gransberg, D.D., Ertas, A., Editors, "Integrated Design and Process Technology," Society for Design and Process Science Publishing, 1996.

53. Rasty, J., H. Shin, "The Effect of Machining Operations on Changes in Curvature and Redistribution of Residual Stresses," Proceedings of the 1995 ASME/Winter Annual Meeting - Symposium on Recent Advances in Structural Mechanics, November 12-17, 1995, San Francisco, CA, PVP-Vol. 321/NE-Vol.18, pp. 65-78.

54. Sofuoglu, H., and Rasty, J. " On the Measurement of Friction Coefficient Utilizing the Ring Compression Test: Part I - Effect of Material Properties," Proceedings of the 1994 ASME European Joint Conference on Engineering Systems Design and Analysis (ESDA), Symposium on Design: Analysis, Synthesis, and Applications, July 4-7, 1994, London, England, PD - Vol. 64-8.1, pp. 55-62.

55. Rasty, J., Kolarik, W., and Chen, B.M., "Designing Surface Mounted Components for High Reliability," Journal of Energy Resources Technology, Vol. 116, No. 3, September 1994, pp. 232-239.

56. Rasty, J., and Tamhane, P., "Application of the Finite Element Method to the Quasi-Static Thermoelastic Analysis of Prestress in Multilayer Pressure Vessels," ASME Transactions, Journal of Pressure Vessel Technology, Vol. 116, No. 3, August 1994, pp. 254-260.

57. Hashemi, J., Rasty, J., Li, S., and Tseng, A.A., "Integral Hydro-Bulge Forming of Single and Multi-Layered Spherical Pressure Vessels," ASME Transactions, Journal of Pressure Vessel Technology, Vol. 115, No. 3, August 1993, pp. 249-255.

58. Sofuoglu, H., Rasty, J., "3-D Simulation of the Extrusion Process Utilizing the Physical Modeling Technique," Journal of Energy Sources Technology. Vol. 115, No. 1, March 1993, pp. 32-40.

59. Rasty, J. "Application of the Sach's Boring-out and Finite Element Techniques to the Measurement of Residual Stresses In Oxygen-free High Conductivity Copper Tubes," First International Conference on Processing Materials for Properties, November 7-10, 1993, Honolulu, Hawaii.

60. Rasty, J. "Application of FEM to the Analysis of Tube Drawing Process: I) Effect of Temper on Drawing and Residual Stresses," Proceedings of the Society for Experimental Mechanics, 1993 Spring Conference, June 6-11, 1993, Dearborn, Michigan, pp. 233-247.

61. Rasty, J., Book Section: "Residual (Internal) Stress Considerations in Design," The Engineering Design Process, A. Ertas, and J.C. Jones, John Wiley & Sons Publishing, 1993.

62. Rasty, J., Hunter, D., and Roy, G. "Application of ABAQUS and ADINA Finite Element Codes to the Analysis of Residual Stresses Induced by Rapid Quenching," Proceedings of the Society for Experimental Mechanics, 1993 Spring Conference, June 6-11, 1993, Dearborn, Michigan, pp. 205-213.

63. Rasty, J., Hashemi, J., Hunter D.E. and Dehghani, M., "Finite Element and Experimental Analysis of Stresses due to Quenching Process," Proceedings of the 1992 ASME/Winter Annual Meeting - Symposium on Computational Methods in Materials Processing, November 8-13, 1992, Anaheim, California, MD-Vol. 39 / PED-Vol.61, pp. 195-202.

64. Rasty, J. and Chapman, D., "Isothermal and Thermomechanical Finite-Element Analysis of the Tube Drawing Process Utilizing a Fixed, Tapered Plug," Journal of Materials Engineering and Performance, Vol. 1, No.4, August 1992, pp. 547-554.

65. Jiang, W., Dehghani, M., and Rasty, J. "An Investigation of Hydroforming of Sheet Metals with Varying Blankholding Loads," Proceedings of the 1992 ASME/Winter Annual Meeting - Symposium on Computational Methods in Materials Processing, November 8-13, 1992, Anaheim, California, MD-Vol. 39 / PED-Vol.61, pp. 87-96.

66. Hashemi, J., Rasty, J., and Tseng, A.A. "Application of the Integrated Hydro-Bulge Forming Process to the Manufacturing of Multilayered Spherical Pressure Vessels," Proceedings of the 1992 ASME/Winter Annual Meeting - Symposium on Recent Advances in Structural Mechanics, November 8-13, 1992, Anaheim, CA, PVP-Vol. 248 / NE-Vol.10, pp.73-79.

67. Sofuoglu, H., and Rasty, J., "Three-Dimensional Physical Modeling of Extrusion Process," ASME European Joint Conference on Engineering Systems Design and Analysis, ESDA, June 29-July 3, 1992, Istanbul, Turkey. ASME - PD - Vol. 47-1, pp. 377-386.

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71. Kolarik, W., Rasty, J., Chen, B., and Kim, Y., "Electronics/Avionics Integrity: Definition, Measurement and Improvement," Proceedings of the 1992 Annual Reliability & Maintainability Conference, January, 1992, Las Vegas, Nevada, pp. 460-467.

72. Rasty, J. and Pushkar, T., "Application of the Finite Element Method to the Quasi-Static Thermoelastic Analysis of Prestress in Multilayer Pressure Vessels," Proceedings of the 1991 ASME/Winter Annual Meeting - Pressure Vessel and Piping Symposium, December 1-6, 1991, Atlanta, Georgia. ASME-PVP-Vol. 225 / NE-Vol. 7, pp. 95-102.

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77. Rasty, J. and Hartley, C. S., "A Parametric Study of the Tube Drawing Process Utilizing the Finite Element Method," Proceedings of the 1990 Pacific Conference on Manufacturing, December 17-21, 1990, Sydney and Melbourne, Australia, pp. 243-254.

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82. Cardenas-Garcia, J. F., and Rasty, J., "An Automated Video Optical Diffractometry Technique for Measurement of Strain on Curved Surfaces," Texas Research Seminars Conference, April 24-25, 1989, Dallas, Texas.

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INVITED LECTURES:

1) “FE Investigation into Factors Contributing to Explosion of a Common Table Top Torch”, NAFE, January 14, 2017, New Orleans, Louisiana

2) “Working with Inexperienced or Busy Counsel: The Role of the Expert”, SEAK, Inc., May 15, 2016, Rosemont, Illinois.

3) "A Forensic Engineering Investigation of Failure in Hunting Treestands," National Academy of Forensic Engineers, Newport Beach, CA. (January 20, 2013).

4) National Academy of Forensic Engineers, "Experimental and Computer-Aided Assessment of Damage to Galvanized Steel due to Hail Impact," NAFE, Miami, FL. (January 5, 2012).

5) Texas Society of Professional Engineers, "Forensic Engineering," NSPE, Lubbock, TX. (January 18, 2011).

Dr. Jahan Rasty 806-368-9811 www.ExpertEngineering.com

6) "Principles of Forensic Engineer," Institute for Forensic Sciences, TTU-IFS. (April 25, 2010).

7) "Principles of Failure Analysis and Solid Mechanics", Raytheon Corporation, October 4-5, 2007, Garland, Texas.

8) "Mechanics of Materials & Failure Analysis", Raytheon Corporation, October 13-14, 2006, Dallas, Texas.

9) “Foundations of Engineering Principles: Statics, Dynamics, Materials, Solid Mechanics”, Raytheon Corporation, October 14-15, 2005, Dallas, Texas

10) “Principles of Forensic Engineering”, 2005 Caprock Crime Scene Investigators (CSI) Camp. The Institute for the Development and Enrichment of Advanced Learners (IDEAL), June 30, 2005, Lubbock, TX.

11) “Principles of Forensic Engineering”, 2005 Caprock Crime Scene Investigators (CSI) Camp. The Institute for the Development and Enrichment of Advanced Learners (IDEAL), June 30, 2005, Lubbock, TX.

12) “Foundations of Engineering Principles: Statics, Dynamics, Materials, Solid Mechanics”, Raytheon Corporation, October 15-16, 2004, Dallas, Texas.

13) “Foundations of Engineering Principles: Statics, Materials, Solid Mechanics”, Raytheon Corporation, October 16-18, 2003, Dallas, Texas.

14) “Engineering Principles: Statics, Materials, Solid Mechanics”, Raytheon Corporation, October 17-19, 2002, Dallas, Texas.

15) "Materials Mechanics & Failure Analysis", Raytheon Corporation, October 11-13, 2001, Dallas, Texas.

16) "Design Through Failure Analysis", Raytheon Corporation, March, 20-22, 2000, Dallas, TX.

17) "Design Through Failure Analysis", Raytheon Corporation, March, 17-19, 1999, Dallas, TX.

18) "Failure Analysis Techniques", Raytheon Corporation, Nov. 7-8, 1998 Dallas, Texas.

19) "Design Through Failure Analysis", Texas Instruments, April 13-15, 1998, Dallas, Texas.

20) "Design Through Failure Analysis", Texas Instruments, Sep. 7-8, Oct. 10-11, Nov. 6-7, and Dec. 10-12, 1997, Dallas, Texas.

21) "Materials Research Issues in Aerospace Industry," Lockheed Martin Corporation, Oct. 11, 1996, Fort Worth Texas.

22) "Measurement of Residual Stresses Induced by Non-uniform Cooling of Aluminum Blocks," Alcoa Technical Center, August 21-22, 1991, Alcoa Center, Pennsylvania.

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23) "Finite Element Analysis of Avionics Microelectronics Subjected to Thermal and Vibrational Environments," General Dynamics, December 11, 1990, Fort Worth, Texas.

24) "Effect of Friction on the Physical Modeling of Metal Forming Processes," ASME Winter Annual Meeting, November 25-30, 1990, Dallas, Texas.

25) "Finite Element Analysis of Avionics Microelectronics Subjected to Thermal and Vibrational Environments," General Dynamics, September 24, 1990, Fort Worth, Texas.

26) "Residual Stress Analysis via Experimental, Physical Modeling and Finite Element Techniques," Alcoa Technical Center, June 17-18, 1990, Alcoa Center, Pennsylvania.

27) "Current Research Activities in Residual Stress Analysis and Experimental Mechanics at Texas Tech University," Alcoa Technical Center, May 9-10, 1989, Alcoa Center, Pennsylvania.

28) "Analytical and Experimental Measurement of Residual Stresses in Nuclear Fuel Cladding," Pratt & Whitney Research and Development Center, United Technologies, July 11-12, 1987, West Palm Beach, Florida.

29) "Effective Computer Modeling and Experimental Measurement of Residual Stresses," Shell Oil Company, Westhallow Research Center, August 14-15, 1987, Houston, Texas.

30) "On the Applicability of the Finite Element Methods to the Simulation of Metal Forming Processes," Inland Steel Inc., Research & Development Division, November 17-18, 1987, West Chicago, Indiana.

Exhibit D

THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering
Resume

FULL NAME: Richard H. Crawford **TITLE:** Professor

ENDOWMENT: Earl N. & Margaret Brasfield Endowed Faculty Fellow

DEPARTMENT: Mechanical Engineering

DATE OF BIRTH: August 12, 1954

CITIZENSHIP: USA

SPOUSE'S NAME: Dianne M. Crawford

EDUCATION:	BSME	Louisiana State University	May 1982
	MSME	Purdue University	December 1985
	Ph.D.	Purdue University	December 1989

PROFESSIONAL REGISTRATION: Texas Serial Number 88062

CURRENT AND PREVIOUS ACADEMIC POSITIONS:

The University of Texas at Austin, Professor of Mechanical Engineering, September 2002-present.
The University of Texas at Austin, Associate Professor of Mechanical Engineering, September 1995-August 2002.
The University of Texas at Austin, Assistant Professor of Mechanical Engineering, January 1990-August 1995.
Purdue University, Graduate Teaching Assistant, January 1984-May 1989.
Purdue University, Graduate Research Assistant, January 1983-December 1989.

OTHER PROFESSIONAL EXPERIENCE:

Distributed Visualization Systems Group, Sandia National Laboratory, Livermore, CA, Faculty Intern, June 2003-August 2003.
Electronic Card Assembly and Test, IBM, Austin, TX, Faculty Intern in Manufacturing Engineering, September 1992-August 1993.
Ford Motor Company, Alpha Manufacturing Development Center, Detroit, MI, Faculty Intern, June 1992-August 1992.
Ford Motor Company, Scientific Research Laboratories, Dearborn, MI, Faculty Intern, June 1991-August 1991.
Louisiana State University, Department of Petroleum Engineering, Research Associate, June 1982-December 1982.
Master Maintenance, Inc., Baton Rouge, LA, Heating and Air Conditioning Mechanic, August 1977-September 1979.
East Baton Rouge Parish School Board, Baton Rouge, LA, Heating and Air Conditioning Mechanic, July 1974-July 1977.
Menzie Tile Company, Baton Rouge, LA, Tile Setter's Helper, January 1973-June 1974.

HONORS AND AWARDS:

R. C. Baker Foundation Scholarship, Louisiana State University, 1982
Outstanding Mechanical Engineering Undergraduate, Louisiana State University, Spring 1982
Purdue University Fellow, Purdue University, 1983
Shell Foundation Fellow, Purdue University, 1984-85
Standard Oil of Ohio Fellow, Purdue University, 1986
General Electric Foundation Forgivable Loan Recipient, Purdue University, 1986 & 1989
Society of Automotive Engineers Forgivable Loan Recipient, Purdue University, 1987-88 & 1988-89
Red Apple Award, Austin Independent School District, 1992
American Society for Engineering Education Fred Merryfield Design Award, 1995
Best Paper Award, 1999 ASME Design Theory and Methodology Conference, 1999
Halliburton/Brown & Root Faculty Excellence Award, 2000
Excellence in Education Award, Engineering, Science and Technology Council of Houston, 2001
Maxine and Jack Zarrow Family K-16 Teaching Innovation Award, 2004.
Lockheed Martin Aeronautics Company Excellence in Engineering Teaching Award, 2005.
Ralph Coats Roe Award, American Society for Engineering Education, 2010.
The University of Texas System Regents' Outstanding Teaching Award, 2011.

MEMBERSHIPS IN PROFESSIONAL AND HONORARY SOCIETIES:

Fellow, American Society of Mechanical Engineers.
Member, American Society for Engineering Education.
Member, Association for Computing Machinery.
Member, Society of Automotive Engineers.
Member, Society of Manufacturing Engineers.
Member, Phi Kappa Phi.
Member, Pi Tau Sigma.
Member, Order of the Engineer.
Member, Tau Beta Pi.

PUBLICATIONS:

Refereed Archival Journals

1. Rogers, B., Bosker, G. W., Crawford, R. H, Faustini, M. C., Neptune, R. R., Walden, G., and Gitter, A. J., "Advanced Trans-Tibial Socket Fabrication Using Selective Laser Sintering," *Prosthetics and Orthotics International*, vol. 31, no. 1, pp. 88 – 100, 2007.

2. Turner, C. J., Campbell, M. I., and, Crawford, R. H., "Multidimensional Sequential Sampling for Metamodel Development", *Engineering with Computers*, vol 23, no. 3, pp. 155-174, 2007.

3. Turner, C. J., Crawford, R. H., and Campbell, M. I., "Global Optimization of NURBS-Based Metamodels," *Engineering Optimization*, vol. 39, no. 3, pp. 245-269, 2007.

4. Faustini, M. C., Neptune, R. R., Crawford, R. H., and Stanhope, S. J., "Manufacture of Passive Dynamic Ankle-Foot Orthoses Using Selective Laser Sintering," *IEEE Transactions on Biomedical Engineering*, vol. 55, no. 2, pp. 784-790, 2008.

5. Rogers, B., Bosker, G., Faustini, M., Walden, G., Neptune, R. R., and Crawford, R. H., "Case Report: Variably Compliant Transtibial Prosthetic Socket Fabricated Using Solid Freeform Fabrication," *Journal of Prosthetics and Orthotics*, vol. 20, no. 1, pp. 1-7, 2008.

6. Turner, C. J., and Crawford, R. H., "N-Dimensional Non Uniform Rational B-splines for Metamodeling," *Journal of Computing and Information Science in Engineering*, vol. 9, no. 3, pp. 031002 (13 pages), 2009.

7. Montgomery, J. T., Vaughan, M. R., and Crawford, R. H., "Design of an Actively Actuated Prosthetic Socket," *Rapid Prototyping Journal*, vol. 16, no. 3, pp. 194-201, 2010.

8. Weaver, J., Wood, K., Crawford, R., and Jensen, D., "Transformation Design Theory: A Meta-Analogical Framework," *Journal of Computing and Information Science in Engineering*, vol. 10, no. 3, pp. 031012 (11 pages), 2010.

9. Vaughan, M. R., and Crawford, R. H., "Effectiveness of Virtual Models in Design for Additive Manufacturing: A Laser Sintering Case Study," *Rapid Prototyping Journal*, vol. 19, no. 1, pp. 11-19, 2013.

10. Steuben, J., Turner, C., and Crawford, R., "Robust Engineering Design Optimization with NURBs-Based Metamodels," *Engineering Optimization*, vol. 45, no. 7, pp. 767-786, 2013.

11. Camburn, B., Otto, K., Jensen, D., Crawford, R., Wood, K., "Designing Biologically Inspired Leaf Structures: Computational Geometric Transport Analysis of Volume-To-Point Flow Channels," *Engineering with Computers*, vol. 31, no. 2, pp 361-374, 2014.

12. Blanchard, S., Judy, J., Muller, C., Crawford, R. H., Petrosino, A. J., White, C. K., Lin, F.-A., and Wood, K. L., "Beyond Blackboards: Engaging Underserved Middle School Students in Engineering," *Journal of Pre-College Engineering Education Research (J-PEER)*, vol. 5, no. 1, article 2, 2015, 14 pages.

13. Camburn, B., Dunlap, B., Gurjar, T., Hamon, C., Green, M., Jensen, D., Crawford, R., Otto, K., and Wood, K., "A Systematic Method for Design Prototyping," *Journal of Mechanical Design*, vol. 137, no. 8, 081102, 2015, 12 pages.

14. Camburn, B., Viswanathan, V. Linsey, J., Anderson, D., Jensen, D., Crawford, R., Otto, K., and Wood, K., "Design Prototyping Methods: State-of-the-Art in Techniques, Strategies, and Heuristics," *Design Science*, in press (published online August 3, 2017, https://doi.org/10.1017/dsj.2017.10).

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1. Turner, C. J., Crawford, R. H., and Campbell, M. I., "Mixed Integer Optimization with NURBS HyperModels," *Proceedings of the 27th ASME Computers and Information in Engineering Conference*, Las Vegas, NV, September 4-7, 2007.

2. Ma, G., and Crawford, R. H., "Identifying the Critical Points of Skeleton-Based Convolution Surfaces for Conceptual Design," *Proceedings of the 27th ASME Computers and Information in Engineering Conference*, Las Vegas, NV, September 4-7, 2007.

3. Talley, A. B., Schmidt, K. J., Crawford, R. H., and Wood, K. L., "Understanding the Effects of Active Learning in Action: What Happens When the "New" Wears Off in Teacher Training," *Proceedings of the 2008 ASEE Annual Conference and Exposition*, Pittsburgh, PA, June 22-25, 2008.

4. Ajetunmobi, A. M., Turner, C. J., and Crawford, R. H., "Robust Optimization with NURBS HyperModels," *Proceedings of the 28th ASME 2008 Computers and Information in Engineering Conference*, New York, NY, August 2-6, 2008.

5. Ma, G., and Crawford, R. H., "Topological Consistency in Skeletal Modeling with Convolution Surfaces," *Proceedings of the 28th ASME 2008 Computers and Information in Engineering Conference*, New York, NY, August 2-6, 2008.

6. Talley, A. B., and Crawford, R. H., "Creating LEGO Prototypes for K-5 Using Functional Modeling," *Proceedings of the 2009 ASEE Annual Conference and Exposition*, Austin, TX, June 14-17, 2009.

7. Talley, A., White, C., Wood, K., and Crawford, R., "Designing Interdisciplinary Curriculum and Teaching: Investigating Innovation in our Engineered World," *Proceedings of the 2010 ASEE Annual Conference and Exposition*, Louisville, KY, June 20-23, 2010.

8. White, C., Talley, A., Jensen, D., Wood, K., Szmerekovsky, A., and Crawford, R., "From Brainstorming to C-Sketch to Principles of Historical Innovators: Ideation Techniques to Enhance Student Creativity," *Proceedings of the 2010 ASEE Annual Conference and Exposition*, Louisville, KY, June 20-23, 2010.

9. White, C., Crawford, R., Wood, K., and Talley, A., "Influences and Interests in Humanitarian Engineering," *Proceedings of the 2010 ASEE Annual Conference and Exposition*, Louisville, KY, June 20-23, 2010.

10. Weaver, J., Wood, K., Crawford, R., and Jensen, D., "Design of Energy Harvesting Technology: Feasibility For Low-Power Wireless Sensor Networks," *Proceedings of the 2010 ASME International Design Engineering Technical Conferences*, Montreal, Quebec, Canada, August 18-21, 2010.

11. Camburn, B., Wood, K., Jensen, D., Crawford, R., Wood, J., and Guillemette, J., "When to Transform? Development of Indicators for Design Context Evaluation," *Proceedings of the 2010 ASME International Design Engineering Technical Conferences*, Montreal, Quebec, Canada, August 18-21, 2010.

12. Kuhr, R., Wood, K., Jensen, D., and Crawford, R., "Concept Opportunity Diagrams and Constituent Relationship Charts: A Visual Modeling Method to Explore Multifunctional Design Concepts," *Proceedings of the 2010 ASME International Design Engineering Technical Conferences*, Montreal, Quebec, Canada, August 18-21, 2010.

13. Talley, A., Crawford, R. H., White, C., and Wood, K. L., "Longitudinal Evaluation of Project-Based Professional Development Institute: Mixed Method Assessment with MBTI Type Correlations," *Proceedings of the 2011 ASEE Annual Conference and Exposition*, Vancouver, B.C., Canada, June 26-29, 2011.

14. Talley, A., Crawford, R. H., and Talley, K., "Engineering Applicability of a Universal Design Performance, Measure," *Proceedings of the 2011 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, Washington, DC, August 28-21, 2011.

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20. Jensen, D. D., Wood, J. J., Knodel, P., Wood, K. L., Crawford, R. H., and Vincent, R., "Evaluating Ideation Using the Publications Popular Science, Popular Mechanics, and Make in Coordination with a New Patent Search Tool and the 6-3-5 Method," *Proceedings of the 2012 ASEE Annual Conference and Exposition*, San Antonio, TX, June 10-13, 2012.

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22. Allen, D. T., Crawford, R. H., Berland, L. K., High, K. A., Petrosino, A. J., Dobbs, T. A., Farmer, C., and Marshall, J. A., "A Course Sequence in Engineering Design and Problem

Solving," *Proceedings of the 2012 ASEE Annual Conference and Exposition*, San Antonio, TX, June 10-13, 2012.

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24. Berland, L. K., Allen, D. T., Crawford, R. H., Farmer, C., and Guerra, L., "Learning Sciences Guided High School Engineering Curriculum Development," *Proceedings of the 2012 ASEE Annual Conference and Exposition*, San Antonio, TX, June 10-13, 2012.

25. Farmer, C., Allen, D. T., Berland, L. K., Crawford, R. H., Guerra, L., "Engineer Your World: An Innovative Approach to Developing a High School Engineering Design Course," *Proceedings of the 2012 ASEE Annual Conference and Exposition*, San Antonio, TX, June 10-13, 2012.

26. Guerra, L., Allen, D. T., Crawford, R. H., and Farmer, C., "A Unique Approach to Characterizing the Engineering Design Process," *Proceedings of the 2012 ASEE Annual Conference and Exposition*, San Antonio, TX, June 10-13, 2012.

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30. Camburn, B., Wood, K., Crawford, R., Robbens, J., Jensen, D., and Patil, A., "Advances in Transformational Design: Correlating Context Evaluation to Quality, Feasibility, and Novelty," *Proceedings of the 2012 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, Chicago, IL, August 12-15, 2012.

31. Talley, A. B., Crawford, R. H., and White, C. K., "Curriculum Exchange: Middle School Students Go Beyond Blackboards to Solve the Grand Challenges," *Proceedings of the 2013 ASEE Annual Conference and Exposition*, Atlanta, GA, June 23-26, 2013.

32. White, C. K., Crawford, R. H., Talley, A. B., Petrosino, A. J., and Bland, K., "Girls Go Beyond Blackboards towards Positive Attitudes about Engineering," *Proceedings of the 2013 ASEE Annual Conference and Exposition*, Atlanta, GA, June 23-26, 2013.

33. Vaughan, M. R., and Crawford, R. H., "Use of Concept Generation Techniques in Different Cultural Settings," *Proceedings of the 2013 ASEE Annual Conference and Exposition*, Atlanta, GA, June 23-26, 2013.

34. Camburn, B. A., Dunlap, B. U., Viswanathan, V. K., Linsey, J. S., Jensen, D. D., Crawford, R. H., Otto, K., and Wood, K. L., "Connecting Design Problem Characteristics to Prototyping Choices to Form a Prototyping Strategy," *Proceedings of the 2013 ASEE Annual Conference and Exposition*, Atlanta, GA, June 23-26, 2013.

35. Brown, A. O., Crawford, R. H., Jensen, D. D., Rencis, J. J., Liu, J., Watson, K. A., Jackson, K. S., Hackett, R. K., Schimpf, P. H., Chen, C-C., Orabi, I. I., Akasheh, F., Wood, J. J., Dunlap, B. U., and Sargent, E. R., "Assessment of Active Learning Modules: An Update of Research Findings," *Proceedings of the 2013 ASEE Annual Conference and Exposition*, Atlanta, GA, June 23-26, 2013.

36. Camburn, B. A., Dunlap, B. U., Kuhr, R., Viswanathan, V. K., Linsey, J. S., Jensen, D. D., Crawford, R. H., Otto, K., Wood, K. L., "Methods for Prototyping Strategies in Conceptual Phases of Design: Framework and Experimental Assessment," *Proceedings of the 2013 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, Portland, OR, August 4-7, 2013.

37. Seshagiri, N. K. and Crawford, R. H., "Computing Geometric Transformations of Irregular Teeth Sets for Orthodontic Treatment," *Proceedings of the 2013 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, Portland, OR, August 4-7, 2013.

38. Ma, G., and Crawford, R., "Conceptual Design by a Topology Consistency Skeletal Modeler with Convolution Surfaces," *Proceedings of the ASME 2013 International Mechanical Engineering Congress & Exposition*, San Diego, CA, November 15-21, 2013.

39. Hamon, C. L., Green, M. G., Dunlap, B., Camburn, B. A., Crawford, R. H., and Jensen, D. D., "Virtual or Physical Prototypes? Development and Testing of a Prototyping Planning Tool," *Proceedings of the 2014 ASEE Annual Conference and Exposition*, Indianapolis, IN, June 15-18, 2014.

40. Brown, A. O., Jensen, D. D., Crawford, R. H., Rencis, J. J., Sargent, E. R., Dunlap, B. U., Hackett, R. K., Jackson, K. S., Watson, K. A., Orabi, I. I., Liu, J., and Wood, J. J., "Active Learning Modules Assessments: An Update of Results by Gender and Ethnic Groups," *Proceedings of the 2014 ASEE Annual Conference and Exposition*, Indianapolis, IN, June 15-18, 2014.

41. Brown, A. O., Watson, K. A., Liu, J., Orabi, I. I., Rencis, J. J., Chen, C-C., Akasheh, F., Wood, J. J., Jackson, K. S., Hackett, R. K., Sargent, E. R., Dunlap, B. U., Wejmar, C. A., Crawford, R. H., and Jensen, D. D., "Assessment of Active Learning Modules: An Update on Research Findings," *Proceedings of the 2014 ASEE Annual Conference and Exposition*, Indianapolis, IN, June 15-18, 2014.

42. Marshall, K. S., Crawford, R., Green, M., and Jensen, D., "Analogy Seeded Mind-Maps: Testing of a New Design-By-Analogy Tool," *Proceedings of the 2014 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, Buffalo, NY, August 17-20, 2014.

43. Vaughan, M. R., Seepersad, C. C., and Crawford, R. H., "Creation of Empathic Lead Users from Non-Users via Simulated Lead User Experiences," *Proceedings of the 2014 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, Buffalo, NY, August 17-20, 2014.

44. Dunlap, B. U., Hamon, C. L., Camburn, B. A., Crawford, R. H., Jensen, D. D., Green, M. G., Otto, K., and Wood, K. L., "Heuristics-Based Prototyping Strategy Formation: Development and Testing of a New Prototyping Planning Tool," *Proceedings of the ASME 2014 International Mechanical Engineering Congress & Exposition*, Montreal, Quebec, Canada, November 14-20, 2014.

45. Brown, A. O., Jensen, D. D., Schimpf, P. H., Crawford, R. H., Orabi, I. I., Watson, K. A., Liu, J., Jackson, K. S., Chen, C-C., Akasheh, F., Orr, M., Webster, K. L., Turvey, G., and Bhattacharyya, "Active Engineering Education Modules: A Summary of Recent Research Findings," *Proceedings of the 2015 ASEE Annual Conference and Exposition*, Seattle, WA, June 14-17, 2015.

46. Marshall, K. S., Crawford, R. H., and Jensen, D. D., "Analogy Seeded Mind-Maps: A Simple and Quick Design-by-Analogy Method," *Proceedings of the 2015 ASEE Annual Conference and Exposition*, Seattle, WA, June 14-17, 2015.

47. Gurjar, T., Crawford, R., Jensen, D., "Effects of a Structured Prototyping Strategy on Capstone Design Projects," *Proceedings of the 2015 ASEE Annual Conference and Exposition*, Seattle, WA, June 14-17, 2015.

48. Camburn, B. A, Jensen, D., Crawford, R., Otto, K., and Wood, K., "Evaluation of a Strategic Method to Improve Prototype Performance with Reduced Cost and Fabrication Time," *Proceedings of the 20th International Conference on Engineering Design (ICED 15)*, Milan, Italy, July 27-30, 2015.

49. Camburn, B., En Sng, K. H., Perez, K. B., Otto, K., Wood, K., Jensen, D., and Crawford, R., "The Way Makers Prototype: Principles of DIY Design," *Proceedings of the 2015 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, Boston, MA, August 2-5, 2015.

50. Marshall, S., Crawford, R., and Jensen, D., "Analogy Seeded Mind-Maps: A Comparison of Verbal and Pictorial Representation of Analogies in the Concept Generation Process," *Proceedings of the 2016 International Design Engineering Technical Conference & Computers and Information in Engineering Conference*, Charlotte, NC, August 21-24, 2016.

51. Chang, Y-C., and Crawford, R. H., "Design of a Desktop Wire-feed Prototyping Machine," *2017 Annual Solid Freeform Fabrication Symposium Proceedings*, Austin, TX, August 7-9, 2017.

PATENTS:

1. "Method For Fabricating Artificial Bone Implant Green Parts," U.S. Patent 5,639,402, June 17, 1997.

2. "Mold Useful for Injection Molding of Plastics and Methods of Production and Uses Thereof," U.S. Patent 5,678,162, October 14, 1997.

3. "Artificial Bone Implants," U. S. Patent 6,183,515, February 6, 2001.

4. "Artificial Bone Implants," U. S. Patent 6,540,784, April 1, 2003.

5. "Rotary Plate Fastener for Ceiling Fan Blades," U. S. Patent 7,223,078, May 29, 2007.

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EXPERT TESTIMONY AND DEPOSITIONS

YETI vs. RTIC claims construction deposition and hearing, 2016
YETI vs. RTIC expert report depositions, December 2016, January 2017